

COMPUTERFACTS™

Technical Service Data

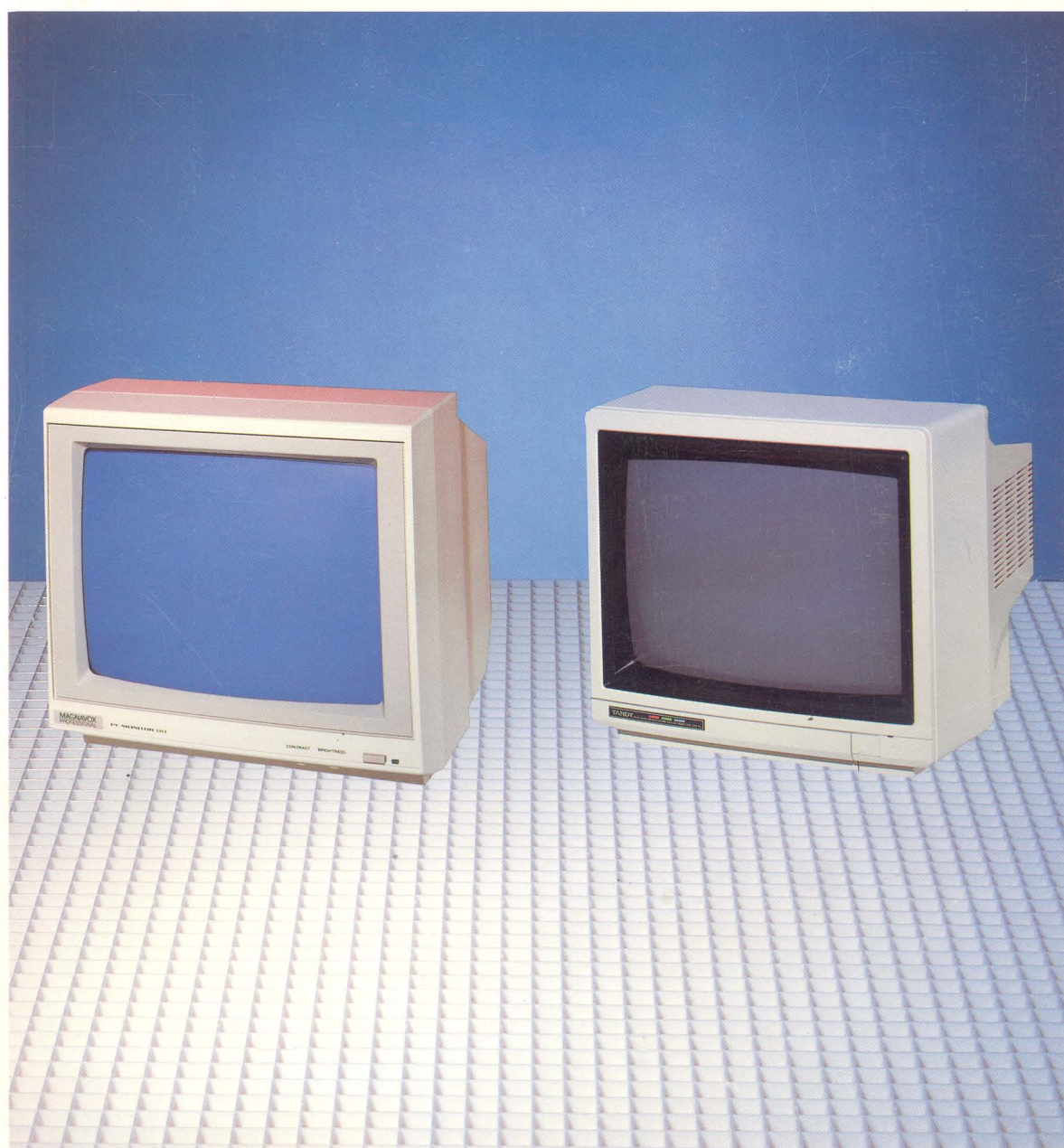
MAGNAVOX®

MODEL 7BM613074G

RADIO SHACK®

MODEL CM11

MONITOR



FEATURES • COMPLETE SCHEMATICS • PRELIMINARY SERVICE CHECKS • TROUBLESHOOTING TIPS •
EASY-READ WAVEFORMS • REPLACEMENT PARTS LISTS • SEMICONDUCTOR CROSS-REFERENCE

PRELIMINARY SERVICE CHECKS

This data provides the user with a time-saving service tool designed for quick isolation and repair of Monitor malfunctions.

Check all interconnecting cables for good connection and correct hookup before making service checks.

TEST EQUIPMENT AND TOOLS

TEST EQUIPMENT

Digital Volt/Ohm Meter
High Voltage Probe
CRT Tester
Degaussing Coil
Pattern Generator

TOOLS

Phillips Screwdriver
7/16" Nutdriver Socket
Low Voltage Soldering Iron
Desoldering Tool

SAMS™ **Howard W. Sams & Co.**
4300 West 62nd Street, P.O. Box 7092, Indianapolis, Indiana 46206 U.S.A.

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co. as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co. by the manufacturers of the particular type of replacement part listed.

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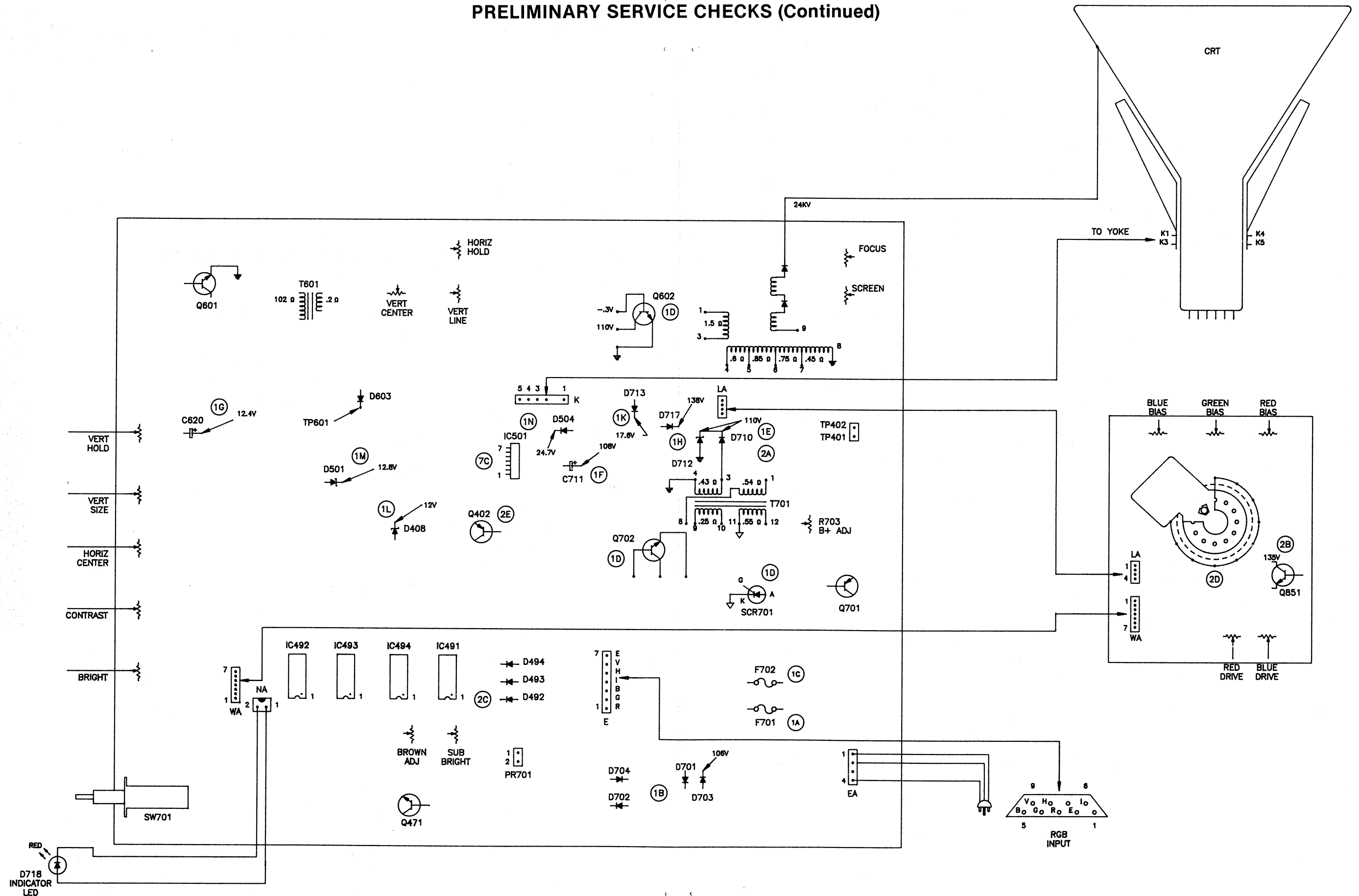
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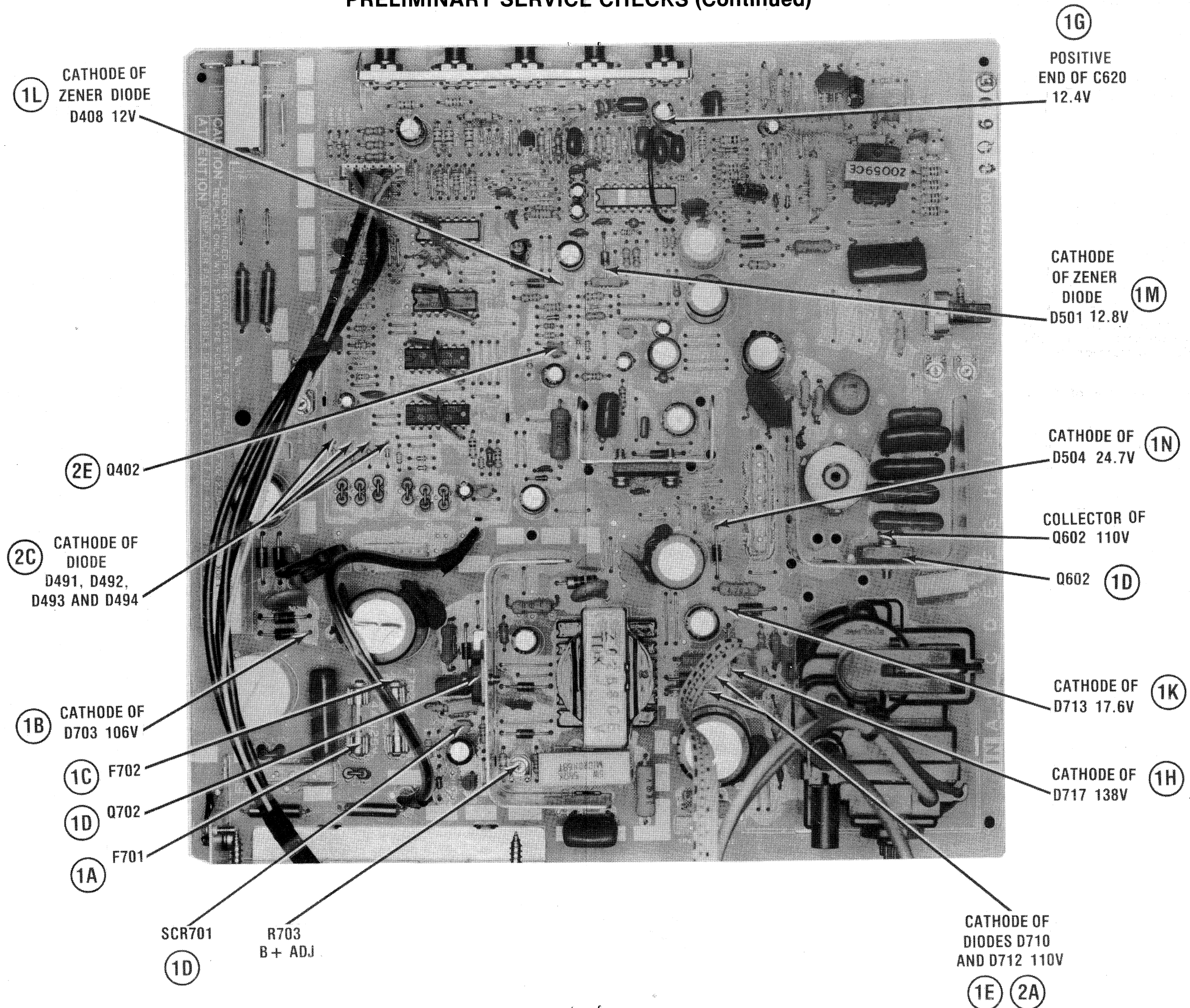
PRELIMINARY SERVICE CHECKS (Continued)



INTERCONNECTING DIAGRAM

INTERCONNECTING DIAGRAM

PRELIMINARY SERVICE CHECKS (Continued)



PRELIMINARY SERVICE CHECKS (Continued)

SERVICE CHECKS

MATCH THE NUMBERS ON THE INTERCONNECTING DIAGRAM AND PHOTOS WITH THE NUMBERS ON THE SERVICE CHECKS TO BE PERFORMED.

① POWER SUPPLY

- (A) Check AC Fuse (F701) and replace if open.
- (B) If Fuse (F701) is open, check Diodes D701 thru D704.
- (C) Check DC Fuse (F702) and replace if open.
- (D) If Fuse (F702) is open, check Power Regulator Transistor (Q702), Horizontal Output Transistor (Q602) and SCR701.
- (E) Check for 110V at cathode of Diode D710.
- (F) Check for 108V at anode of Electrolytic C711.
- (G) Check for 12.4V at anode of Electrolytic C620.
- (H) Check for 138V at cathode of Diode D717.
- (K) Check for 17.6V at cathode of Diode D713.
- (L) Check for 12V at cathode of Zener Diode D408.

POWER SUPPLY CONTINUED

- (M) Check for 12.8V at cathode of Zener Diode D501.
- (N) Check for 24.7V at cathode of Diode D504.

② NO RASTER

- (A) Check for 110V at cathode of Diode D710.
- (B) Check for 135V at collector of Transistor Q851.
- (C) Check voltages and waveforms at cathode of Diodes D491 thru D494. If signals are missing, check Connection between Monitor and Computer.
- (D) If signals are present, check voltages and waveforms at collector of Output Transistors (Q851, Q861 and Q871).
- (E) Check voltages and waveforms at base and emitter of Blanking Transistor (Q402).

PRELIMINARY SERVICE CHECKS (Continued)

DISASSEMBLY INSTRUCTIONS

CABINET BACK REMOVAL

Remove four screws from back of cabinet, remove two screws holding cord assembly to back of cabinet. Remove cabinet back.

CHASSIS REMOVAL

Remove cabinet back. Disconnect HV anode, CRT socket, Degaussing Coil Plug, RGB Plug E, Yoke Plug K, AC Cord Plug EA and grounded wire. Disconnect indicator cable. Slide main chassis out of cabinet.

CRT REMOVAL

Follow "Chassis Removal" procedure and lay set facedown on a soft protective surface. Loosen and remove CRT neck assemblies. Remove four screws holding CRT to cabinet front and lift CRT out of cabinet. DO NOT LIFT CRT BY THE NECK.

MISCELLANEOUS ADJUSTMENTS

B+ ADJUSTMENT

Adjust B+ Control (R703) for 110V at the cathode of D710.

HORIZONTAL HOLD ADJUSTMENT

Connect Monitor to Computer, fill screen with H's. Adjust Horizontal Hold Control (R607) until characters on screen are stable. Turn Power Switch OFF and ON several times, and readjust R607 until picture remains stable.

VERTICAL SIZE ADJUSTMENT

Connect Monitor to Computer, fill screen with H's. Adjust Vertical Size Control (R507) for a display height of 170mm.

VERTICAL LINEARITY ADJUSTMENT

Connect Monitor to Computer, fill screen with H's. Adjust V-Lin Control (R526) until height of each character varies no more than 10% of the average character size.

FOCUS ADJUSTMENT

Connect Monitor to Computer, fill screen with H's. Set Brightness Control to center position. Rotate Focus Control for best Focus.

COLOR PURITY ADJUSTMENT

Turn On Monitor for at least 15 minutes before performing Color Purity Adjustment. Degauss CRT with an external degaussing coil. Set Contrast Control to center range and set Brightness Control to Maximum clockwise position. Disconnect Connector E from printed circuit, to obtain a blank raster. Set Screen Control for a normal raster. Rotate Red Bias Control (R862) and Blue Bias Control (R864) counterclockwise to cut off the Red and the Blue. Rotate Green Bias Control (R863) clockwise to produce a green raster. Loosen deflection yoke clamp, pull yoke back. Move tabs on purity rings to produce a uniform

green vertical band at the center of screen. Slide deflection yoke to obtain a uniform green raster. Tighten deflection yoke clamp, check red and blue-field purity by reducing the Green output and increasing the Red and Blue output. Reconnect Connector E to printed circuit board. Perform "Black and White Tracking" procedure.

CONVERGENCE ADJUSTMENT

Connect a Computer or generator to Computer to produce a crosshatch pattern on the screen. Adjust 4-pole magnets to converge the red and blue vertical and horizontal lines at center of screen. Adjust 6-pole magnets to converge the red, blue and green vertical and horizontal lines at the center of screen. Remove rubber wedges from the CRT. Tilt yoke vertically and horizontally to converge edges of screen. Apply adhesive to wedges and carefully replace on CRT.

BLACK AND WHITE TRACKING

Set Brightness Control, Red and Blue Drive Controls to center positions. Set Monitor for high intensity white, Video Cutoff Switch (SW851) Off. Rotate Screen Control counterclockwise until raster appears dimly on screen. If raster is Red Adjust Controls R863 and R864 until raster becomes white. If raster is Green, Adjust Controls R862 and R864. If raster is Blue, Adjust Controls R862 and R863. Place Switch SW851 to ON position. Adjust Red and Blue Drive Controls for a white raster. Set Brightness Control to Maximum, adjust Screen Control for 3.8V DC between TP402 and TP403.

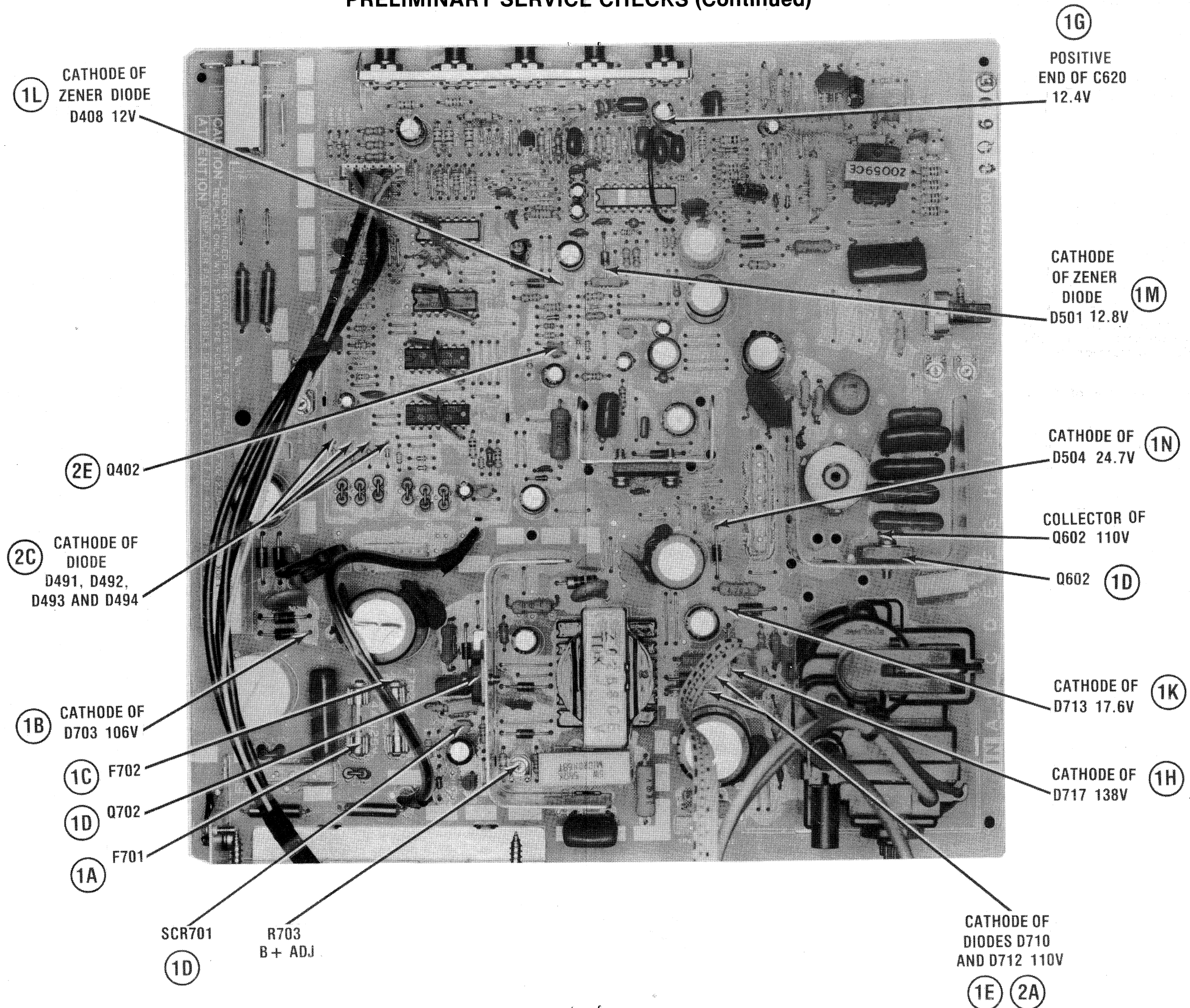
HIGH VOLTAGE CHECK

Connect a high voltage probe to CRT anode. Turn SW851 Off. Turn Screen Control fully counterclockwise. Nominal High Voltage is 22.0KV.

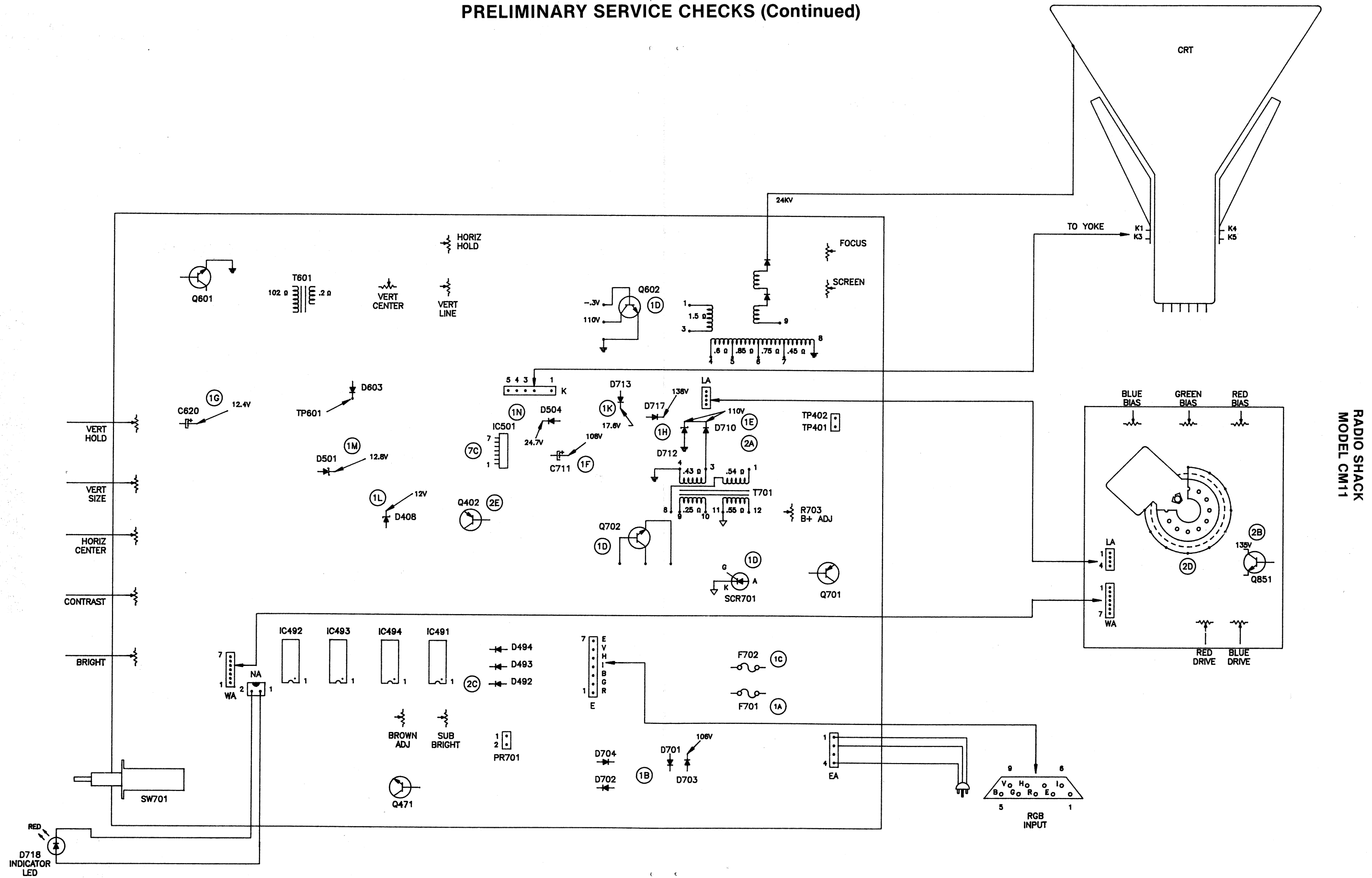
NOTE: There is no high voltage adjustment on this Monitor High voltage should not exceed 23.0KV.

RADIO SHACK
MODEL CM11

PRELIMINARY SERVICE CHECKS (Continued)



PRELIMINARY SERVICE CHECKS (Continued)



INTERCONNECTING DIAGRAM

INTERCONNECTING DIAGRAM

PRELIMINARY SERVICE CHECKS (Continued)

ENVIRONMENT

Computers perform best in a clean, cool area that is below 80 degrees Fahrenheit and free of dust and smoke particles. Even though home Computers are not affected by cigarette smoke as much as commercial Computers are affected, it is better to maintain a smoke-free area around the Computer. Do not block cabinet vents of Computer, Monitor, Printer or other power devices.

ELECTRICAL POWER

Variations in the line voltage can affect the Computer. Try to avoid these fluctuations by using an AC receptacle that is on a power line not used by appliances or other heavy current demand devices. A power-surge protector, power-line conditioner or noninterruptible power supply may be needed to cure the problem. DO NOT switch power On and Off frequently.

KEYBOARD

Liquids spilled into the Keyboard can ruin it. Immediately after a spill occurs, disconnect the Computer power plug from AC power outlet. Then, if circuitry or contacts are contaminated, disassemble the Keyboard and carefully rinse the Keyboard printed circuit board with distilled water and let it dry. Use a cotton swab between the keys. Use a nonabrasive contact cleaner and lint-free wipers on accessible connectors and contacts.

DISK DRIVES

Clean the read/write heads of the Disk Drives about once a month or after 100 hours usage. Use only an approved head cleaning kit.

Handle carefully to preserve proper disk head alignment. A sudden bump or jolt to the Disk Drives can knock the disk head out of alignment. If Disk Drive must be transported, place an old disk in slot and close door during transport.

Store disks in their protective covers and never touch the disk surface. Observe the disk handling precautions usually found on the back of disk protective covers.

PRINTERS

Carefully vacuum the Printer regularly. Wipe surface areas clean using a light all-purpose cleaner. Do not clean the machine. The oil will collect abrasive grit and dust. The dust will act as a blanket. This can cause components to overheat and fail.

STATIC ELECTRICITY

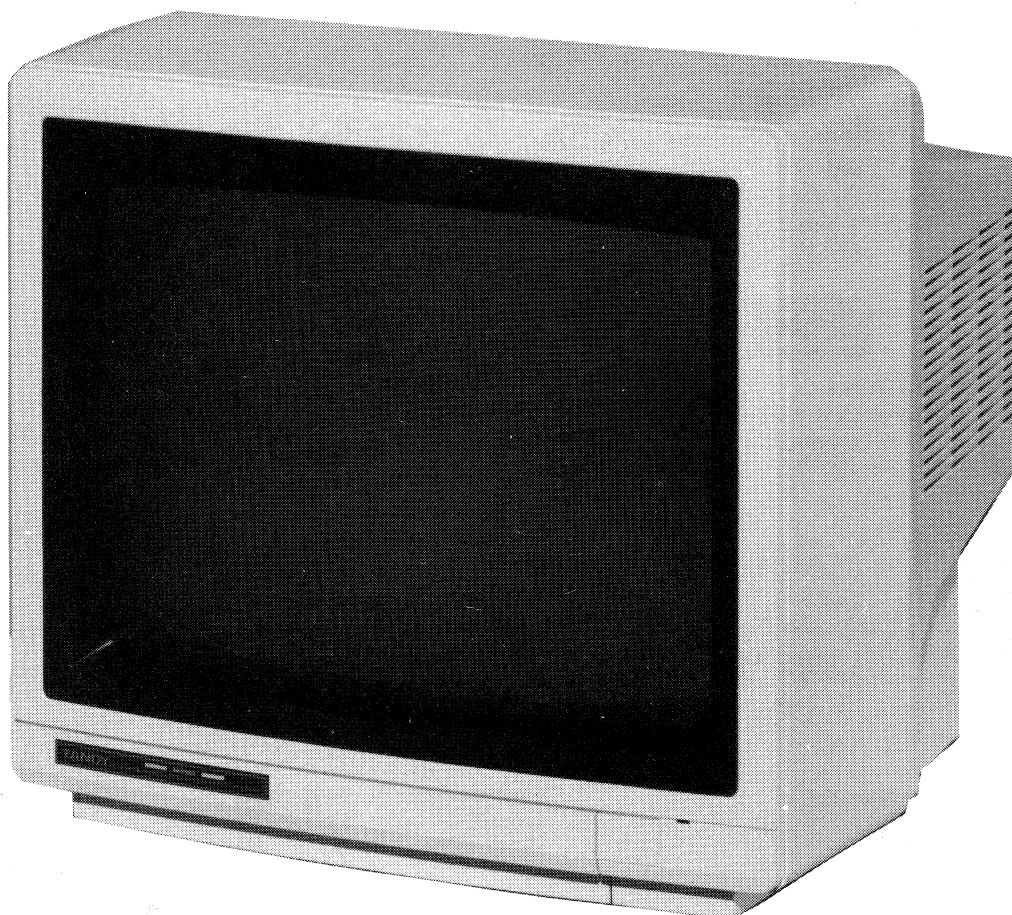
Static electricity discharge can affect the Computer. In order to minimize the possibility, use anti-static mats, sprays, tools and materials and maintain good humidity in the Computer environment.

MONITOR

Use an isolation transformer with any Monitor that does not come as part of the system since some Monitors use a HOT chassis (chassis connected to one side of the AC line). The face of the Monitor should never be left on for long periods of time at high brightness level except when pattern is being changed periodically. Use caution when cleaning anti-glare screens to preserve the glare-reduction feature.

RADIO SHACK
MODEL CM11

CMT13-1



CMT13-1

RADIO SHACK
MODEL CM11

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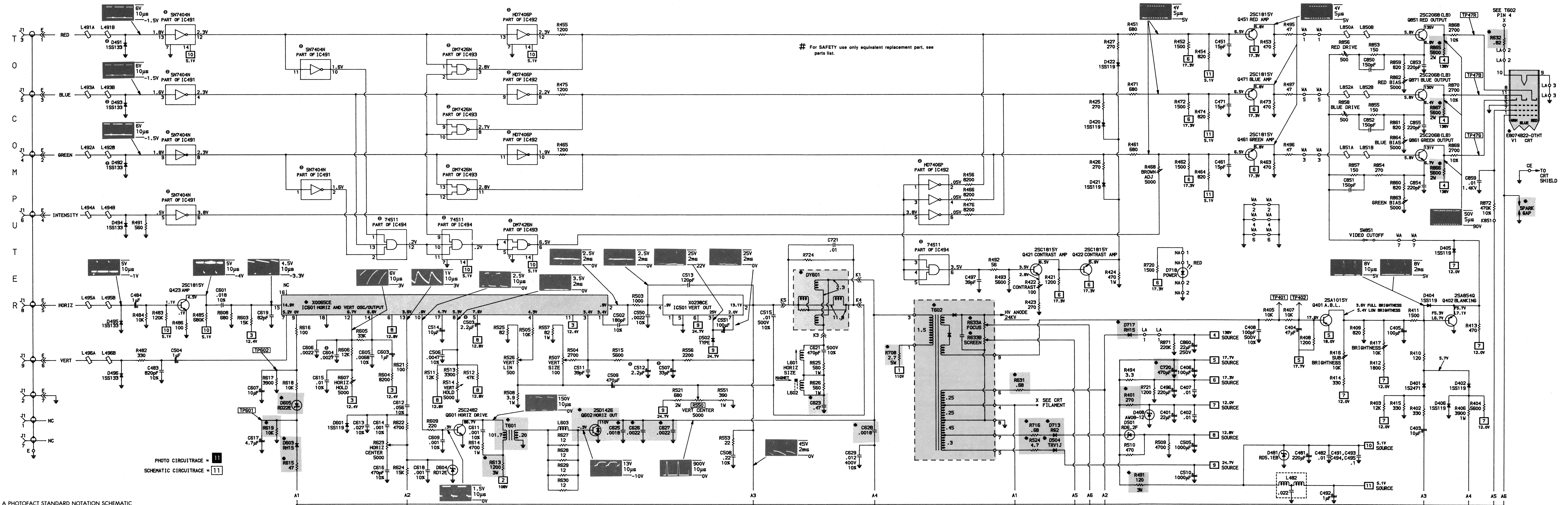
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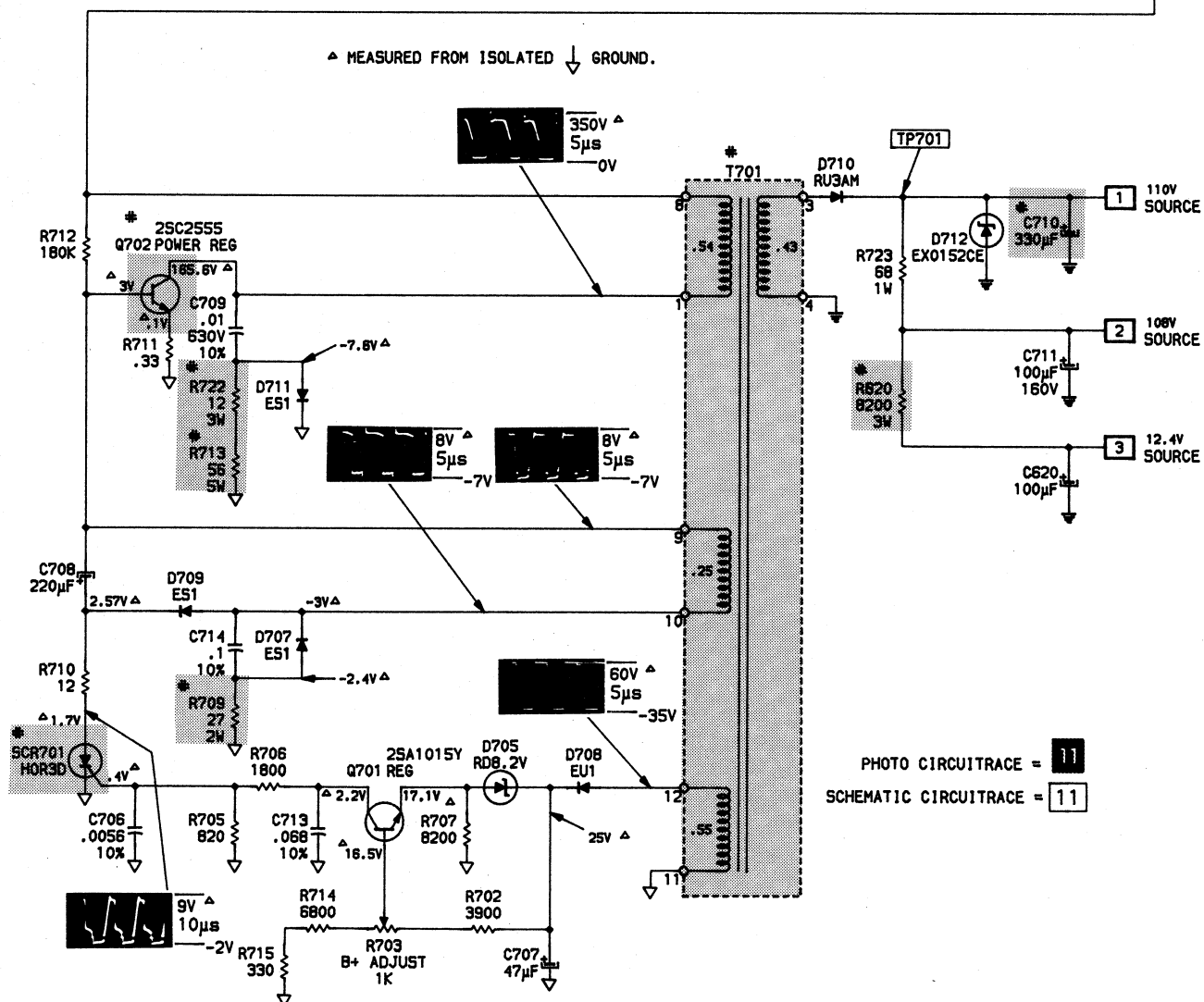
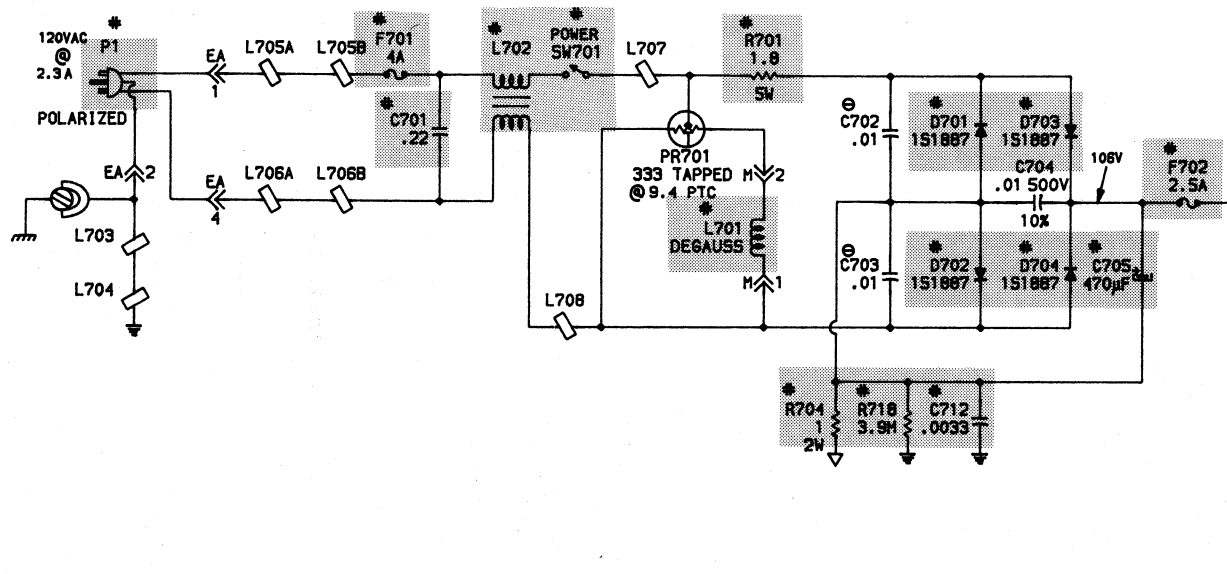
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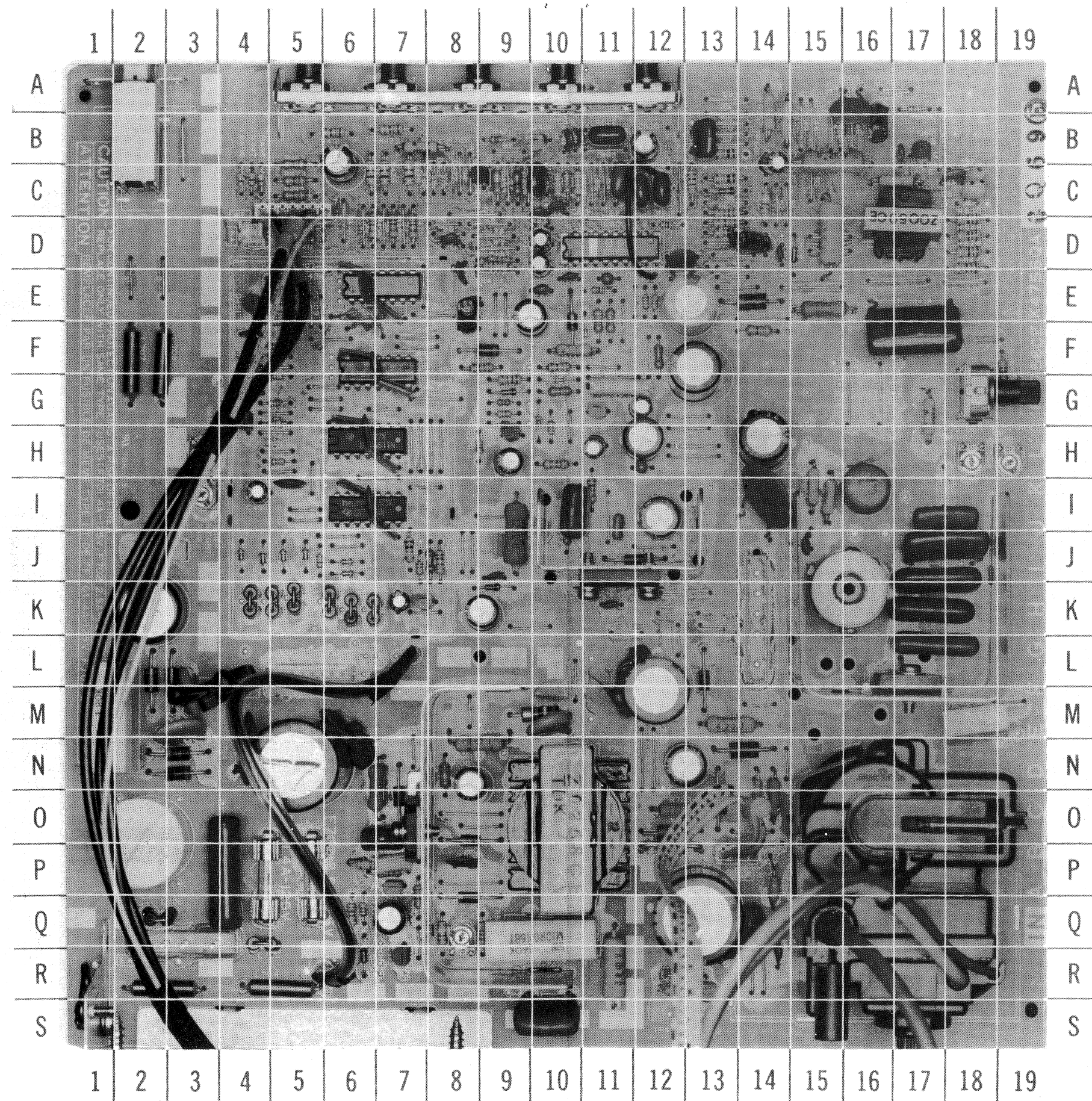


**RADIO SHACK
MODEL CM11**



A PHOTOFAC[®] STANDARD NOTATION SCHEMATIC
WITH **CIRCUITRACE[®]**

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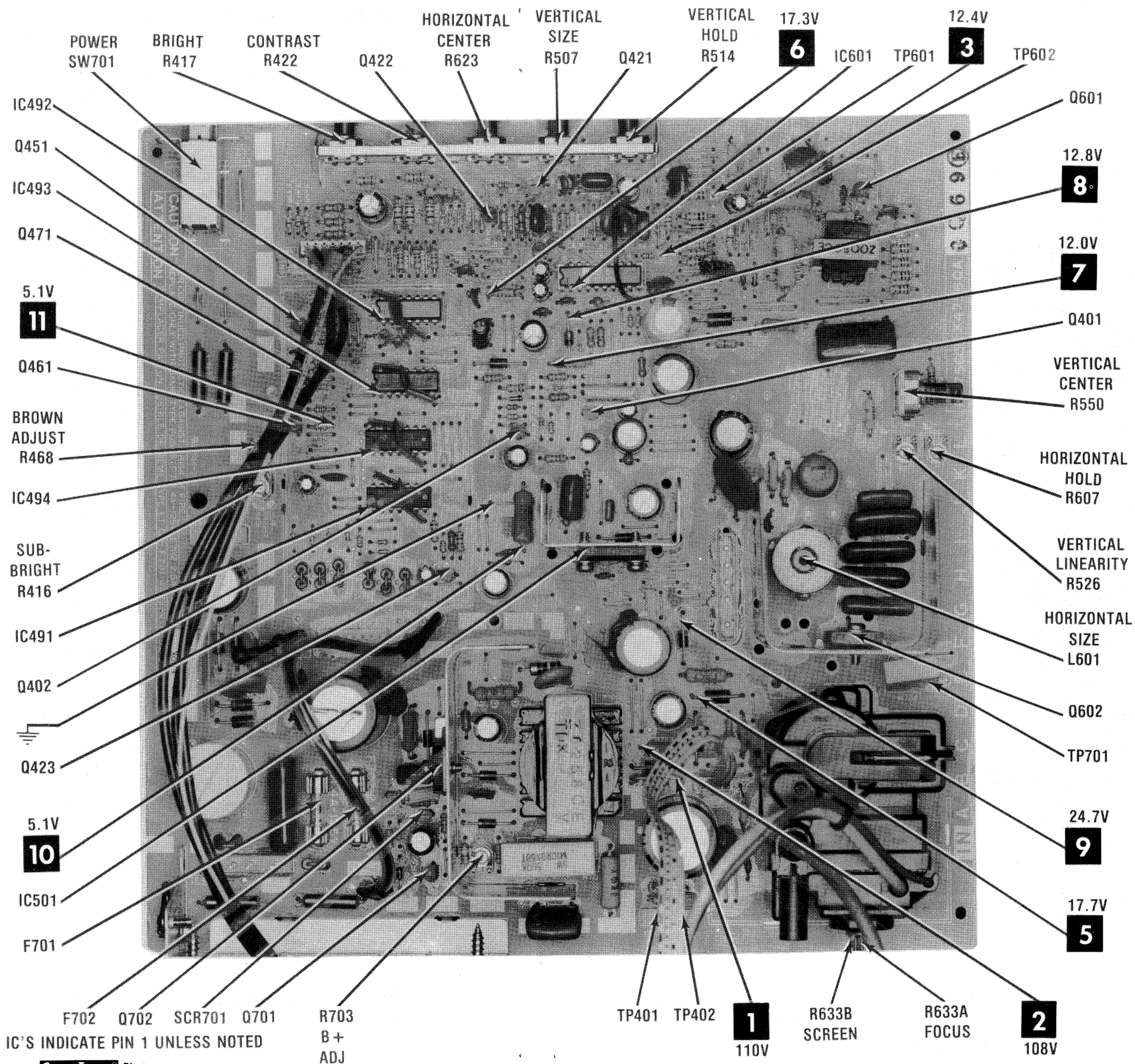
RADIO SHACK
MODEL CM11

MAIN BOARD GridTrace LOCATION GUIDE

C401	E-8	C712	M-10	L708	F-2	R503	E-11
C402	E-8	C713	P-7	LA	P-14	R504	D-13
C403	G-12	C714	O-14	M	J-2	R505	D-13
C404	H-12	C720	N-13	NA	D-4	R507	A-10
C405	H-9	D401	G-9	PR701	K-2	R508	B-14
C406	E-9	D402	G-10	Q401	G-11	R509	D-12
C407	E-8	D404	G-9	Q402	H-9	R510	E-11
C408	R-14	D405	G-10	Q421	B-10	R511	E-12
C451	E-5	D406	F-11	Q422	C-9	R512	E-12
C461	G-4	D408	F-9	Q423	K-7	R513	D-12
C471	F-4	D420	C-7	Q451	E-4	R514	A-12
C481	K-9	D421	C-8	Q461	G-4	R515	E-11
C482	J-9	D422	C-8	Q471	F-4	R521	E-15
C483	C-10	D481	K-9	Q601	B-17	R524	M-13
C484	K-7	D491	J-6	Q602	L-17	R525	F-19
C491	I-6	D492	J-6	Q701	R-7	R526	H-18
C492	I-5	D493	J-5	Q702	O-7	R550	G-18
C493	H-6	D494	J-5	R401	F-10	R551	G-17
C494	E-6	D495	J-6	R402	F-10	R553	J-10
C495	F-6	D496	J-6	R403	G-9	R556	I-11
C496	B-6	D501	E-10	R404	G-10	R557	A-14
C497	D-8	D502	J-11	R405	R-12	R603	C-10
C502	E-10	D504	L-13	R406	G-11	R604	A-17
C503	E-11	D601	B-12	R407	R-12	R605	C-10
C504	D-10	D603	E-14	R408	H-10	R606	B-15
C505	E-13	D604	D-15	R409	A-5	R607	H-19
C506	D-12	D605	C-13	R410	G-9	R608	C-10
C507	H-12	D701	N-3	R411	H-10	R609	C-13
C508	I-10	D702	L-2	R412	B-6	R613	B-15
C509	H-14	D703	N-3	R413	G-9	R614	C-17
C510	F-13	D704	L-3	R414	H-9	R615	F-14
C511	E-9	D705	R-6	R415	F-9	R616	D-12
C512	H-12	D707	O-7	R416	I-3	R617	C-14
C513	K-11	D708	Q-8	R417	A-5	R618	C-13
C514	D-10	D709	O-8	R421	B-9	R619	B-13
C515	I-14	D710	P-12	R422	A-7	R620	B-15
C550	I-11	D711	Q-10	R423	D-7	R621	C-13
C551	I-12	D712	O-12	R424	D-7	R622	B-11
C601	C-10	D713	N-14	R425	C-7	R623	A-9
C603	B-16	D717	O-13	R425	C-7	R624	F-12
C604	C-11	E	L-5	R426	C-7	R625	I-15
C605	C-12	EA	Q-3	R427	C-6	R626	I-15
C606	C-12	F701	P-4	R451	E-5	R627	D-18
C607	B-14	F702	P-5	R452	E-5	R628	D-18
C609	B-17	IC491	I-6	R453	C-5	R629	D-18
C611	C-18	IC492	E-6	R454	F-5	R630	D-18
C612	B-13	IC493	F-6	R455	D-6	R631	O-14
C613	B-11	IC494	H-6	R456	E-6	R632	O-14
C614	B-10	IC501	J-11	R461	H-5	R633A	S-17
C615	A-16	IC601	D-11	R462	G-5	R633B	S-17
C616	B-10	K	K-14	R463	B-5	R701	M-2
C617	D-14	L482	I-5	R464	G-5	R702	Q-8
C618	D-14	L491A	K-4	R465	D-7	R703	Q-8
C619	C-10	L491B	K-4	R466	F-6	R704	N-9
C620	B-12	L492A	K-5	R468	H-3	R705	Q-6
C621	J-15	L492B	K-5	R471	F-5	R706	Q-7
C623	F-17	L493A	K-5	R472	F-5	R707	Q-6
C625	L-17	L493B	K-5	R473	C-5	R708	M-18
C626	K-17	L494A	K-6	R474	G-5	R709	N-6
C627	J-17	L494B	K-6	R475	D-7	R710	P-7
C628	J-18	L495A	K-6	R476	E-7	R711	P-6
C629	I-18	L495B	K-6	R481	J-9	R712	N-8
C701	P-4	L601	K-16	R482	D-9	R713	Q-10
C702	M-3	L602	I-16	R484	J-7	R714	Q-9
C703	M-3	L603	C-18	R485	J-8	R715	Q-9
C704	N-4	L702	O-2	R486	J-8	R716	P-14
C705	N-5	L703	R-2	R491	J-5	R718	M-10
C706	P-8	L704	R-5	R492	C-9	R720	D-5
C707	Q-7	L705A	Q-4	R493	C-9	R721	D-5
C708	N-8	L705B	Q-4	R494	D-9	R722	R-11
C709	S-10	L706A	Q-2	R495	C-4	R723	O-12
C710	Q-13	L706B	Q-2	R496	C-4	SCR701	P-7
C711	M-12	L707	F-2	R497	C-4	SW701	A-2

CMT13-1

RADIO SHACK
MODEL CM11



DISASSEMBLY INSTRUCTIONS

CABINET BACK REMOVAL

Remove four screws from back of cabinet, remove two screws holding cord assembly to back of cabinet. Remove cabinet back.

CHASSIS REMOVAL

Remove cabinet back. Disconnect HV anode, CRT socket, Degaussing Coil Plug, RGB Plug E, Yoke Plug K, AC Cord Plug EA and grounded wire. Disconnect indicator cable. Slide main chassis out of cabinet.

CRT REMOVAL

Follow "Chassis Removal" procedure and lay set facedown on a soft protective surface. Loosen and remove CRT neck assemblies. Remove four screws holding CRT to cabinet front and lift CRT out of cabinet. DO NOT LIFT CRT BY THE NECK.

MISCELLANEOUS ADJUSTMENTS

B+ ADJUSTMENT

Adjust B+ Control (R703) for 110V at the cathode of D710.

HORIZONTAL HOLD ADJUSTMENT

Connect Monitor to Computer, fill screen with H's. Adjust Horizontal Hold Control (R607) until characters on screen are stable. Turn Power Switch OFF and ON several times, and readjust R607 until picture remains stable.

VERTICAL SIZE ADJUSTMENT

Connect Monitor to Computer, fill screen with H's. Adjust Vertical Size Control (R507) for a display height of 170mm.

VERTICAL LINEARITY ADJUSTMENT

Connect Monitor to Computer, fill screen with H's. Adjust V-Lin Control (R526) until height of each character varies no more than 10% of the average character size.

FOCUS ADJUSTMENT

Connect Monitor to Computer, fill screen with H's. Set Brightness Control to center position. Rotate Focus Control for best Focus.

COLOR PURITY ADJUSTMENT

Turn On Monitor for at least 15 minutes before performing Color Purity Adjustment. Degauss CRT with an external degaussing coil. Set Contrast Control to center range and set Brightness Control to Maximum clockwise position. Disconnect Connector E from printed circuit, to obtain a blank raster. Set Screen Control for a normal raster. Rotate Red Bias Control (R862) and Blue Bias Control (R864) counterclockwise to cut off the Red and the Blue. Rotate Green Bias Control (R863) clockwise to produce a green raster. Loosen deflection yoke clamp, pull yoke back. Move tabs on purity rings to produce a uniform

green vertical band at the center of screen. Slide deflection yoke to obtain a uniform green raster. Tighten deflection yoke clamp, check red and blue-field purity by reducing the Green output and increasing the Red and Blue output. Reconnect Connector E to printed circuit board. Perform "Black and White Tracking" procedure.

CONVERGENCE ADJUSTMENT

Connect a Computer or generator to Computer to produce a crosshatch pattern on the screen. Adjust 4-pole magnets to converge the red and blue vertical and horizontal lines at center of screen. Adjust 6-pole magnets to converge the red, blue and green vertical and horizontal lines at the center of screen. Remove rubber wedges from the CRT. Tilt yoke vertically and horizontally to converge edges of screen. Apply adhesive to wedges and carefully replace on CRT.

BLACK AND WHITE TRACKING

Set Brightness Control, Red and Blue Drive Controls to center positions. Set Monitor for high intensity white, Video Cutoff Switch (SW851) Off. Rotate Screen Control counterclockwise until raster appears dimly on screen. If raster is Red Adjust Controls R863 and R864 until raster becomes white. If raster is Green, Adjust Controls R862 and R864. If raster is Blue, Adjust Controls R862 and R863. Place Switch SW851 to ON position. Adjust Red and Blue Drive Controls for a white raster. Set Brightness Control to Maximum, adjust Screen Control for 3.8V DC between TP402 and TP403.

HIGH VOLTAGE CHECK

Connect a high voltage probe to CRT anode. Turn SW851 Off. Turn Screen Control fully counterclockwise. Nominal High Voltage is 22.0KV.

NOTE: There is no high voltage adjustment on this Monitor High voltage should not exceed 23.0KV.

CMT13-1

RADIO SHACK
MODEL CM11

TEST EQUIPMENT

Test Equipment listed by Manufacturer illustrates typical or equivalent equipment used by SAMS' Engineers to obtain measurements and is compatible with most types used by field service technicians.

TEST EQUIPMENT (COMPUTERFACTS)

Equipment	B & K Precision Equipment No.	Sencore Equipment No.	Notes
OSCILLOSCOPE	1570A,1590A,1596	SC61	
LOGIC PROBE	DP51,DP21		
LOGIC PULSER	DP101,DP31		
DIGITAL VOM	2830,2806	DVM37,DVM56,SC61	
ANALOG VOM	277,111,116		
ISOLATION TRANSFORMER	TR110,1604,1653,1655	PR57	
FREQUENCY COUNTER	1803,1805	FC71,SC61	
COLOR BAR GENERATOR	1211A,1251,1260,1249	CG25,VA62	
RGB GENERATOR	1260,1249		
FUNCTION GENERATOR	3020,3011,3030		
HI-VOLTAGE PROBE VOM/DMM Accessory probes	HV-44 PR-28(HV)	HP200	
TEMPERATURE PROBE	TP-28,TP-30		
CRT ANALYZER	467,470	CR70	
DIGITAL IC TESTER	560,550,552		
CAPACITANCE ANALYZER		LC53,LC75,LC76 LC77	
INDUCTANCE ANALYZER		LC53,LC75,LC76 LC77	

TROUBLESHOOTING

POWER SUPPLY

Check AC Fuse (F701). If open, check Diodes D701 thru D704. If Fuse F701 is good check Fuse F702. If open check Power Supply Regulator Transistor (Q702) for short. If Q702 is good, check Regulator Transistor (Q701), SCR701 and Diodes D707 thru D711, and Zener Diode D705 for shorts. If all components are good, check Electrolytic C708, Zener Diode D712 and Transformer T701. Check for 110V at cathode of Diode D710, 108V at positive of Electrolytic C711 and 12.4V at positive of Electrolytic C620. Check voltages produced from Horizontal circuit. Check for 138V at cathode of Diode D717, 17.7V at cathode of Diode D713, 12V at cathode of Zener Diode D408, 12.8V at anode of Zener Diode D501 and 24.7V at cathode of Diode D504.

HORIZONTAL

Check for 24KV at anode of CRT, if not present, check for 110V at collector of Horizontal Output Transistor (Q602). If voltage is missing, check for 110V at pin 1 of Horizontal Output Transformer (T602). If 110V is not present, check Resistor R708, if Resistor is open, check Transistor Q602 for short and check Capacitors C623, C625, C626 and C627. If 110V is present, refer to

troubleshooting, the "Power Supply" section of this troubleshooting guide. If 114V is present at collector of Transistor Q602, inject a horizontal signal at base of Transistor Q602. If high voltage returns, check voltages, waveforms and components associated with Horizontal Drive Transistor (Q601), Horizontal and Vertical OSC/Output IC (IC601) and Horizontal Drive Transformer (T601). If high voltage does not return with horizontal signal injected at base of Transistor Q601. Check Transistor Q601, Transformer T602, Capacitors C623, C625, C626 and C627 and associated components. Check voltages that are supplied by Horizontal Output Transformer T602. Check for 138V at cathode of Diode D717, 17.7V at cathode of Diode D713, 12V at cathode of Zener Diode D408, 12.8V at anode of Zener Diode D501 and 24.7V at cathode of Diode D504. If any source is missing, check components associated with circuitry related to missing source.

VERTICAL

If there is no vertical deflection, check voltages, waveforms and components associated with Vertical Out IC (IC501). Inject a vertical signal at pin 2 of Horizontal and Vertical OSC/Output IC (IC601). If vertical

TROUBLESHOOTING (Continued)

deflection returns, check voltages, waveforms and components associated with IC601 and Electrolytic C509. If vertical deflection does not return, check voltages and components associated with IC501, check IC501 by substitution. Check vertical winding of Deflection Yoke, Vertical Center Control (R550) and Electrolytic C510.

RASTER

Check CRT and CRT voltages. If there is no green, check voltages, waveforms and components associated with Green Amp Transistor (Q461) and Green Output Transistor (Q861). If waveform is present at Test Point TP47G, check CRT by substitution. If waveform is not present at base of Transistor Q461, check waveform at pin 9 of IC491. If waveform is present at pin 9 of IC491, check IC491, IC492, IC493 and IC494. If waveform is not present at pin 9 of IC491, check Diode D492, Interface Cable and Connector at J1.

If there is no red, check voltages, waveforms and components associated with Red Amp Transistor (Q451) and Red Output Transistor

(Q851). If waveform is present at Test Point TP47R, check CRT by substitution. If waveform is not present at base of Transistor Q451, check waveform at pin 13 of IC491. If waveform is present at pin 13 of IC491, check IC491, IC492, IC493 and IC494. If waveform is not present at pin 13 of IC491, check Diode D491, Interface Cable and Connector at J1.

If there is no blue, check voltages, waveforms and components associated with Blue Amp Transistor (Q471) and Blue Output Transistor (Q871). If waveform is present at Test Point TP47B, check CRT substitution. If waveform is not present at base of Transistor Q471, check waveform at pin 3 of IC491. If waveform is present at pin 3 of IC491, check IC491, IC492, IC493 and IC494. If waveform is not present at pin 3 of IC494, Check Diode D493, Interface Cable and Connector at J1.

If waveforms are not present at TP47R, TP47B and TP47G but are present at the base of Transistors Q851, Q871 and Q861, check voltages, waveforms and components associated with ABL Transistors Q401 and Q402.

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RADIO SHACK
MODEL CM11

8 PARTS LIST AND DESCRIPTION

When ordering parts, state Model, Part Number, and Description

SEMICONDUCTORS (Select replacement for best results)

ITEM No.	MFGR. PART No./ TYPE No.	NTE PART No.	ECG PART No.	RCA PART No.	ZENITH PART No.	NOTES
D401	1S2471 DX-2447 H-DX0046CE	NTE519 NTE519 NTE519	ECG519 ECG519 ECG519	SK3100/519 SK3100/519 SK3100/519	103-131 103-131 103-131	
D402, 4, 5, 6	1SS119 DX-0398	NTE519 NTE519	ECG519 ECG519	SK3100/519 SK3100/519	103-131 103-131	
D408	AW08-12 DX-2451					
D420, 1, 2	H-EX0061CE 1SS119 DX-0398	NTE519 NTE519	ECG519 ECG519	SK3100/519 SK3100/519	103-131 103-131	
D481	RD5-1EB DX-0398	NTE5010A NTE5010A	ECG5010A ECG5010A	SK5A1/5010A SK5A1/5010A	103-279-10 103-279-10	
D491 THRU D496	H-EX0049CE 1SS133 DX-2230	NTE5010A NTE519 NTE519	ECG5010A ECG519 ECG519	SK5A1/5010A SK3100/519 SK3100/519	103-279-10 103-131 103-131	
D501	RD6-2F DX-2253	NTE5013A NTE5013A	ECG5013A ECG5013A	SK6A2/5013A SK6A2/5013A	103-Z9008 103-Z9008	
D502	H-EX0247CE SS277G DX-2276 DX0110CE	NTE5013A NTE116 NTE116 NTE116	ECG5013A ECG116 ECG116 ECG116	SK6A2/5013A SK3312 SK3312 SK3312	103-Z9008 212-76-02 212-76-02 212-76-02	
D504	TVR1J DX-2617 TVR-1J H-DX0105TA	NTE552 NTE552 NTE552 NTE552	ECG552 ECG552 ECG552 ECG552	SK9000/552 SK9000/552 SK9000/552 SK9000/552	103-287 103-287 103-287 103-287	#
D601	1SS119 DX-0398	NTE519 NTE519	ECG519 ECG519	SK3100/519 SK3100/519	103-131 103-131	
D603	RH1S DX-2275 H-DX0086TA	NTE552 NTE552 NTE552	ECG552 ECG552 ECG552	SK9000/552 SK9000/552 SK9000/552	103-287 103-287 103-287	#

PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

SEMICONDUCTORS (Select replacement for best results)

ITEM No.	MFGR. PART No./ TYPE No.						NOTES
		NTE PART No.	ECG PART No.	RCA PART No.	ZENITH PART No.		
D604	RD12E	NTE5021A	ECG5021A	SK12A/5021A	103-279-21	#	
	DX-2306	NTE5021A	ECG5021A	SK12A/5021A	103-279-21		
	H-EX0047CE	NTE5021A	ECG5021A	SK12A/5021A	103-279-21		
	RD22E	NTE5080A	ECG5080A	SK22V/5080A	103-144		
	DX-0235	NTE5080A	ECG5080A	SK22V/5080A	103-144		
D605	H-EX0091CE	NTE5080A	ECG5080A	SK22V/5080A	103-144	#	
	1S1887	NTE116	ECG116	SK3312	212-76-02		
	DX-2443	NTE116	ECG116	SK3312	212-76-02		
	H-DX0038CE	NTE116	ECG116	SK3312	212-76-02		
	RD8-2V	NTE5016A	ECG5016A	SK8A2/5016A	103-Z9019		
D705	DX-2555	NTE5016A	ECG5016A	SK8A2/5016A	103-Z9019	#	
	H-EX0089CE	NTE5016A	ECG5016A	SK8A2/5016A	103-Z9019		
	ES1	NTE552	ECG552	SK9000/552	103-287		
	DX-2556	NTE552	ECG552	SK9000/552	103-287		
	H-DX0248CE	NTE552	ECG552	SK9000/552	103-287		
D707	EU1	NTE552	ECG552	SK9000/552	103-287	#	
	DX-2277	NTE552	ECG552	SK9000/552	103-287		
	DX0131CE	NTE552	ECG552	SK9000/552	103-287		
	ES1	NTE552	ECG552	SK9000/552	103-287		
	DX-2556	NTE552	ECG552	SK9000/552	103-287		
D708	DX0248CE	NTE552	ECG552	SK9000/552	103-287	#	
	RU3AM	NTE580	ECG580	SK3318A	212-Z9000		
	DX-2257	NTE580	ECG580	SK3318A	212-Z9000		
	RU-3AM	NTE580	ECG580	SK3318A	212-Z9000		
	DX0247CE	NTE580	ECG580	SK3318A	212-Z9000		
D709	ES1	NTE552	ECG552	SK9000/552	103-287	#	
	DX-2556	NTE552	ECG552	SK9000/552	103-287		
	DX0248CE	NTE552	ECG552	SK9000/552	103-287		
	RU3AM	NTE580	ECG580	SK3318A	212-Z9000		
	DX-2257	NTE580	ECG580	SK3318A	212-Z9000		
D710	RU-3AM	NTE580	ECG580	SK3318A	212-Z9000	#	
	DX0247CE	NTE580	ECG580	SK3318A	212-Z9000		
	ES1	NTE552	ECG552	SK9000/552	103-287		
	DX-2556	NTE552	ECG552	SK9000/552	103-287		
	ES-1	NTE552	ECG552	SK9000/552	103-287		
D711	DX0248CE	NTE552	ECG552	SK9000/552	103-287	#	
	EX0152CE	NTE552	ECG552	SK9000/552	103-287		
	DX-0856	NTE552	ECG552	SK9000/552	103-287		
	ES1	NTE552	ECG552	SK9000/552	103-287		
	DX-2556	NTE552	ECG552	SK9000/552	103-287		
D712	DX0248CE	NTE552	ECG552	SK9000/552	103-287	#	
	EX0152CE	NTE552	ECG552	SK9000/552	103-287		
	DX-0856	NTE552	ECG552	SK9000/552	103-287		
	ES1	NTE552	ECG552	SK9000/552	103-287		
	DX-2556	NTE552	ECG552	SK9000/552	103-287		

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**RADIO SHACK
MODEL CM11**

2 PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

SEMICONDUCTORS (Select replacement for best results)

ITEM No.	MFGR. PART No./ TYPE No.	NTE PART No.	ECG PART No.	RCA PART No.	ZENITH PART No.	NOTES
D713	RG2 DX-2446 H-DX0181CE	NTE580 NTE580 NTE580	ECG580 ECG580 ECG580	SK5036/580 SK5036/580 SK5036/580	212-Z9000 212-Z9000 212-Z9000	#
D717	RH1S DX-2275 H-DX0086TA	NTE552 NTE552 NTE552	ECG552 ECG552 ECG552	SK9000/552 SK9000/552 SK9000/552	103-287 103-287 103-287	#
IC491	SN7404N SN74504N AMX-4945 HD74504P	NTE7404 NTE74S04 NTE74S04 NTE74S04	ECG7404 ECG74S04 ECG74S04 ECG74S04	SK7404 SK74S04 SK74S04 SK74S04	221-Z9076 HE-443-897 HE-443-897 HE-443-897	
IC492	HD7406P HD7406 AMX-4591 SN7406N	NTE7406 NTE7406 NTE7406 NTE7406	ECG7406 ECG7406 ECG7406 ECG7406	SK7406 SK7406 SK7406 SK7406	HE-443-698 HE-443-698 HE-443-698 HE-443-698	
IC493	DM7426N HD7426 MX-4297 HD7426P SN7426N	NTE7426 NTE7426 NTE7426 NTE7426 NTE7426	ECG7426 ECG7426 ECG7426 ECG7426 ECG7426	SK7426 SK7426 SK7426 SK7426 SK7426		
IC494	74S11 SN74S11N MX-6406 HD74S11S	NTE74S11 NTE74S11 NTE74S11 NTE74S11	ECG74S11 ECG74S11 ECG74S11 ECG74S11	SK74S11 SK74S11 SK74S11 SK74S11		
IC501	X0238CE IX0238CE MX-6160	NTE1676 NTE1676 NTE1676	ECG1676 ECG1676 ECG1676	SK7653/1676 SK7653/1676 SK7653/1676		#
IC601	X0065CE HA11235 MX-6452 H-IX0065CE	NTE1550 NTE1550 NTE1550 NTE1550	ECG1550 ECG1550 ECG1550 ECG1550	SK9249/1550 SK9249/1550 SK9249/1550 SK9249/1550		#

PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

SEMICONDUCTORS (Select replacement for best results)

ITEM No.	MFGR. PART No./ TYPE No.	NTE PART No.	ECG PART No.	RCA PART No.	ZENITH PART No.	NOTES
Q401	2SA1015Y 2SA1015(Y) 2SA-1015Y	NTE290A NTE290A NTE290A	ECG290A ECG290A ECG290A	SK9132 SK9132 SK9132	121-Z9003 121-Z9003 121-Z9003	*
Q402	2SA854Q 2SA854(Q) 2SA-854Q	NTE290A NTE290A NTE290A	ECG290A ECG290A ECG290A	SK3841/294 SK3841/294 SK3841/294	121-Z9003 121-Z9003 121-Z9003	*
Q421, 2, 3	2SC1815Y 2SC1815(Y) 2SC-1815Y	NTE85 NTE85 NTE85	ECG85 ECG85 ECG85	SK3124A/289A SK3124A/289A SK3124A/289A	121-Z9065 121-Z9065 121-Z9065	*
Q451, 61, 71	2SC1815Y 2SC1815(Y) 2SC-1815Y	NTE85 NTE85 NTE85	ECG85 ECG85 ECG85	SK3124A/289A SK3124A/289A SK3124A/289A	121-Z9065 121-Z9065 121-Z9065	*
Q601	2SC2482 2SC-2482	NTE399 NTE399	ECG399 ECG399	SK9352/399 SK9352/399	121-Z9045 121-Z9045	*
Q602	2SD1426 2SD-1426	NTE2302 NTE2302	ECG2302 ECG2302	SK9422 SK9422		#
Q701	2SA1015Y 2SA1015(Y) 2SA1015	NTE290A NTE290A NTE290A	ECG290A ECG290A ECG290A	SK9132 SK9132 SK9132	121-Z9003 121-Z9003 121-Z9003	*
Q702	2SA-1015Y 2SC2555 2SC-2555	NTE290A NTE290A NTE290A	ECG290A ECG290A ECG290A	SK9132 SK9131 SK9131	121-Z9003 121-Z9003 121-Z9003	*
Q851, 61, 71	2SC2068(LB) 2SC-2068LB	NTE376 NTE376	ECG376 ECG376	SK3219 SK3219	121-Z9028 121-Z9028	*
SCR701	H3D42 DX-2558 HSSH3D4					

For SAFETY use only equivalent replacement part.

* Lead configuration may vary from original.

RADIO SHACK
MODEL CM11

PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

ELECTROLYTIC CAPACITORS

ITEM No.	RATING	MFGR. PART No.
C503	2.2 35V 10%	CC225KGBT
C507	33 16V 10%	CC336KDCA
C512	2.2 35V 10%	CC225KGBT

ITEM No.	RATING	MFGR. PART No.
# C705	470 200V	CC477MPBA
# C710	330 160V	CC337MNCC
# C720	470 35V	CC477MGBA

CAPACITORS

ITEM No.	RATING	MFGR. PART No.
# C604	.0027 100V 2%	CC272G2BH
# C623	.47 200V 5%	CC474JPBH
# C625	.0018 1.6KV 5%	CC182JYCH
# C626	.0022 1.6KV 5%	CC222JYCH
# C627	.0022 1.6KV 5%	CC222JYCH

ITEM No.	RATING	MFGR. PART No.
# C628	.0018 1.6KV 5%	CC182JYCH
# C701	.22 125VAC 20%	AC-0991
C702	.01 250VAC 5%	CC103JYBC
C703	.01 250VAC 5%	CC103JYBC
# C712	.0033 125VAC 20%	CC332MXCC

RESISTORS (Power and Special)

ITEM No.	RATING	REPLACEMENT DATA		
		MFGR. PART No.	NTE PART No.	WORKMAN PART No.
	CRT BOARD			
# R865	5600 5% 2W Oxide Film	N0257EHD	22-4114	2W256
# R866	5600 5% 2W Oxide Film	N0257EHD	22-4114	2W256
# R867	5600 5% 2W Oxide Film	N0257EHD	22-4114	2W256
	MAIN BOARD			
# PR701	333 @ Tap 9-4 Cold PTC	ARX-0147		
# R401	270 5% 1W Oxide Film	N0155EGD	1W127	22-3082
# R481	120 5% 3W Oxide Film	N0136EJD	3W112	
# R524	4.7 5% 2W Metal Film	N0047E4HD	2W4D7	
# R613	1200 5% 3W Oxide Film	N0199EJD	3W212	
# R615	47 5% 1/2W Carbon Film	N0099EFC	HW047	22-2064
# R619	10K 5% 1/4W Carbon Film	N0281EEC	QW310	22-1120
# R620	8200 5% 3W Oxide Film	N0271EJD	3W282	
# R631	.68 5% 1/2W Metal Film	N0015EFE	HWD68	
# R632	.82 5% 1W Metal Film	N0018EGD	1WD82	
# R701	1.8 10% 5W WW	N0029FKF	5W1D8	
# R704	1 5% 2W Metal Film	N0022EHD	2W1D0	
# R708	2.7 10% 5W WW	N0034FKF	5W2D7	
# R709	27 5% 2W Oxide Film	N0082EHC	2W027	22-4058
# R713	56 10% 5W WW	N0107FKC	5W056	
# R716	.68 5% 1/2W Metal Film	N0015EFD	HWD68	
# R718	3.9M 10% 1/2W Carbon Film	N0460FFB	HW539	22-2182
# R722	12 5% 3W Oxide Film	N0067EJD	3W012	

COILS & TRANSFORMERS

ITEM No.	FUNCTION	MFGR. PART No.	OTHER IDENTIFICATION	NOTES
# DY601	Yoke	ATB-0007		
L601	Horiz Size	ACA-1022		
L602	Horiz Linearity	ACA-8373		
L603	Peaking	ACA-9021		
# L702	Line Filter	RCILF0113CEZZ		
T601	Horiz Driver	ATB-0495		
# T602	Horiz Output	ATD-0006		
T701	Power	ATA-0026		

For SAFETY use only equivalent replacement part.

PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

CONTROLS (All wattages 1/2 watt, or less, unless listed)

ITEM NO.	FUNCTION	RESISTANCE	MFGR. PART NO.	NOTES
	CRT BOARD			
R856	Red Drive	500	AP-0002	
R858	Blue Drive	500	AP-0002	
R862	Red Bias	5000	AP-0003	
R863	Green Bias	5000	AP-0003	
R864	Blue Bias	5000	AP-0003	
	MAIN BOARD			
R416	Sub-Brightness	10K	P-2010	
R417	Brightness	10K	AP-7003	
R422	Contrast	100		
R507	V-Size	100		
R514	V-Hold	5000		
R623	H. Center	50K		
R468	Brown ADJ.	5000	P-2009	
R526	V-Line	500	AP-2001	
R550	V-Center	5000	AP-6005	
R607	H Hold	5000	P-2009	
R633A	Focus		(1)	
R633B	Screen		(1)	
# R703	B+ ADJ	1000	P-2011	

For SAFETY use only equivalent replacement part.

(1) Part of Horizontal Output Transformer #T602, Part Number ATD-0006.

FUSE DEVICES

ITEM NO.	DESCRIPTION	MFGR. PART NO.		NOTES
		DEVICE	HOLDER	
# F701	4Amp @ 125VAC Fast Blow	AHF-0026	F-1406(1)	
# F702	2.5Amp @ 125VAC Fast Slow	AHF-1302	F-1406(1)	

For SAFETY use only equivalent replacement parts.

(1) Two used for each fuse.

MISCELLANEOUS

ITEM No.	PART NAME	MFGR. PART No.	NOTES
L482	Component Combination	AHC-0372	
L491	Ferrite Bead	AHC-0371	
# L496			
L701	Degaussing Coil	ACA-9017	
L703	Ferrite Bead	AHC-0370	
L704	Ferrite Bead	AHC-0370	
L705	Ferrite Bead	AHC-0371	
L706	Ferrite Bead	AHC-0371	
L707	Ferrite Bead	AHC-0370	
L708	Ferrite Bead	AHC-0370	
L850	Ferrite Bead	RBLN-0020CEZZ	
# L852	Ferrite Bead		
SW701	Switch	AS-0015	Power Video Cut-Off
SW851	Switch	AS-0016	
# V1	CRT	E8074B22-DTHT	
#	AC Cord	AW-0037	

For SAFETY use only equivalent replacement part.

RADIO SHACK
MODEL CM11

PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

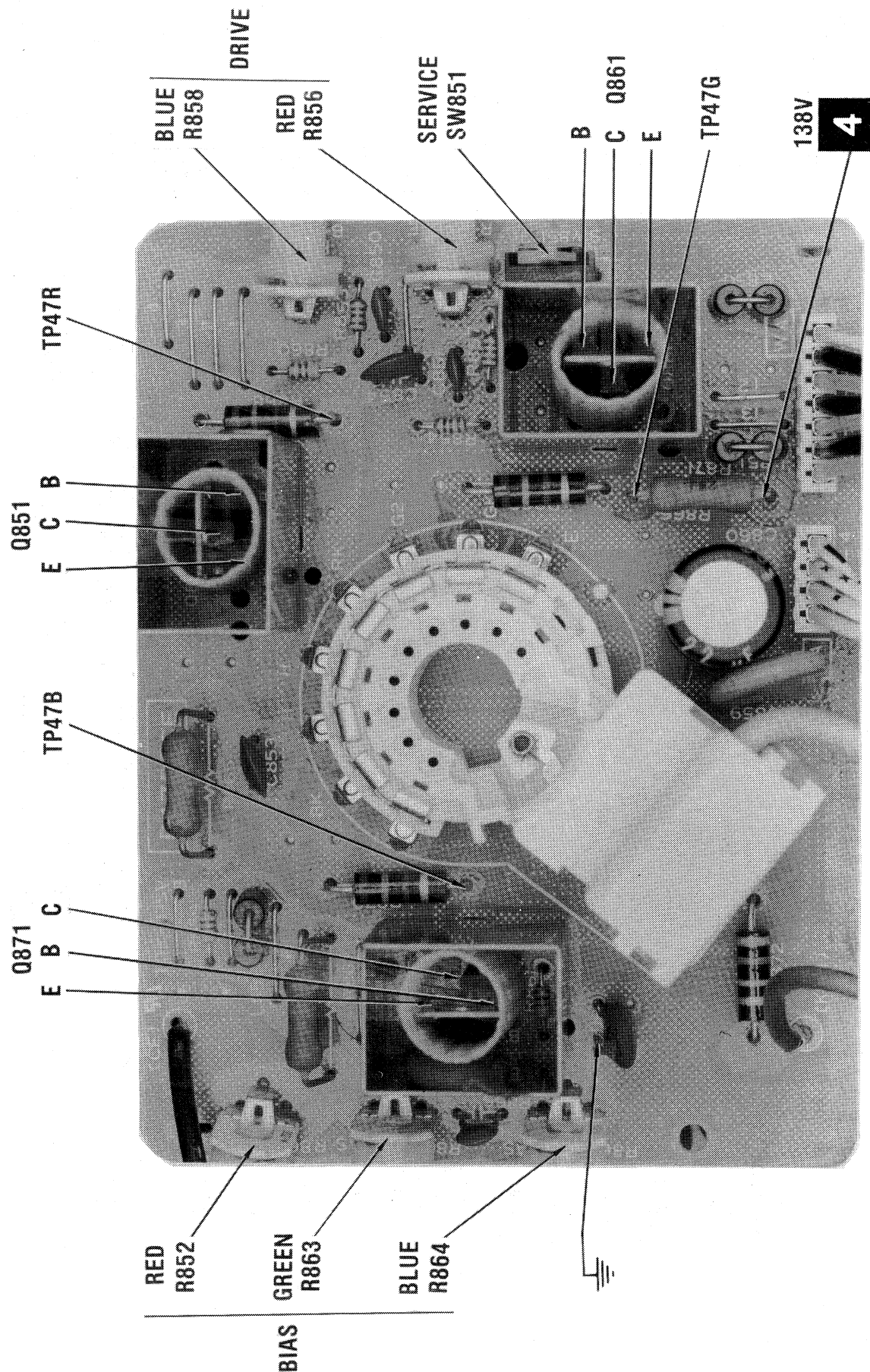
CABINETS & CABINET PARTS (When ordering specify model, chassis & color)

ITEM	PART No.
Cabinet Front	AZ-0123
Cabinet Rear	AZ-0104
Control Door	GDORF1430CESA

ITEM	PART No.
Button, Power Switch	ARB-5023
Knob, Control	AK-0338

WIRING DATA

High Voltage Lead	Use BELDEN No. 9867 (30 KV)
Shielded Hook-up Wire	Use BELDEN No. 8401 or 8421 (Single-Conductor) 8208 (Two-Conductor)
General-use Unshielded Hook-up Wire	Use BELDEN No. 8529 (Solid) Available in 13 Colors 8522 (Stranded) Available in 13 Colors

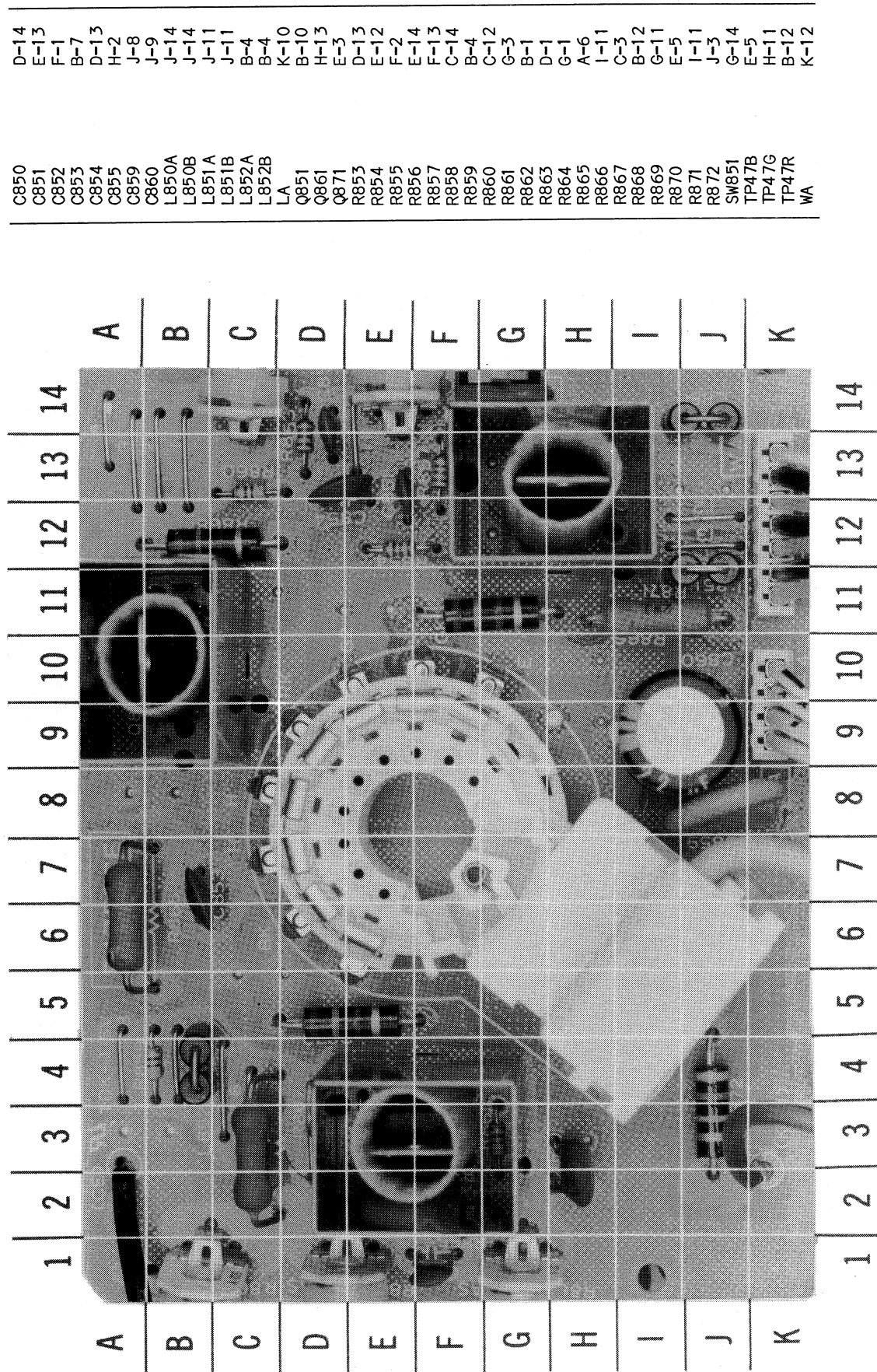


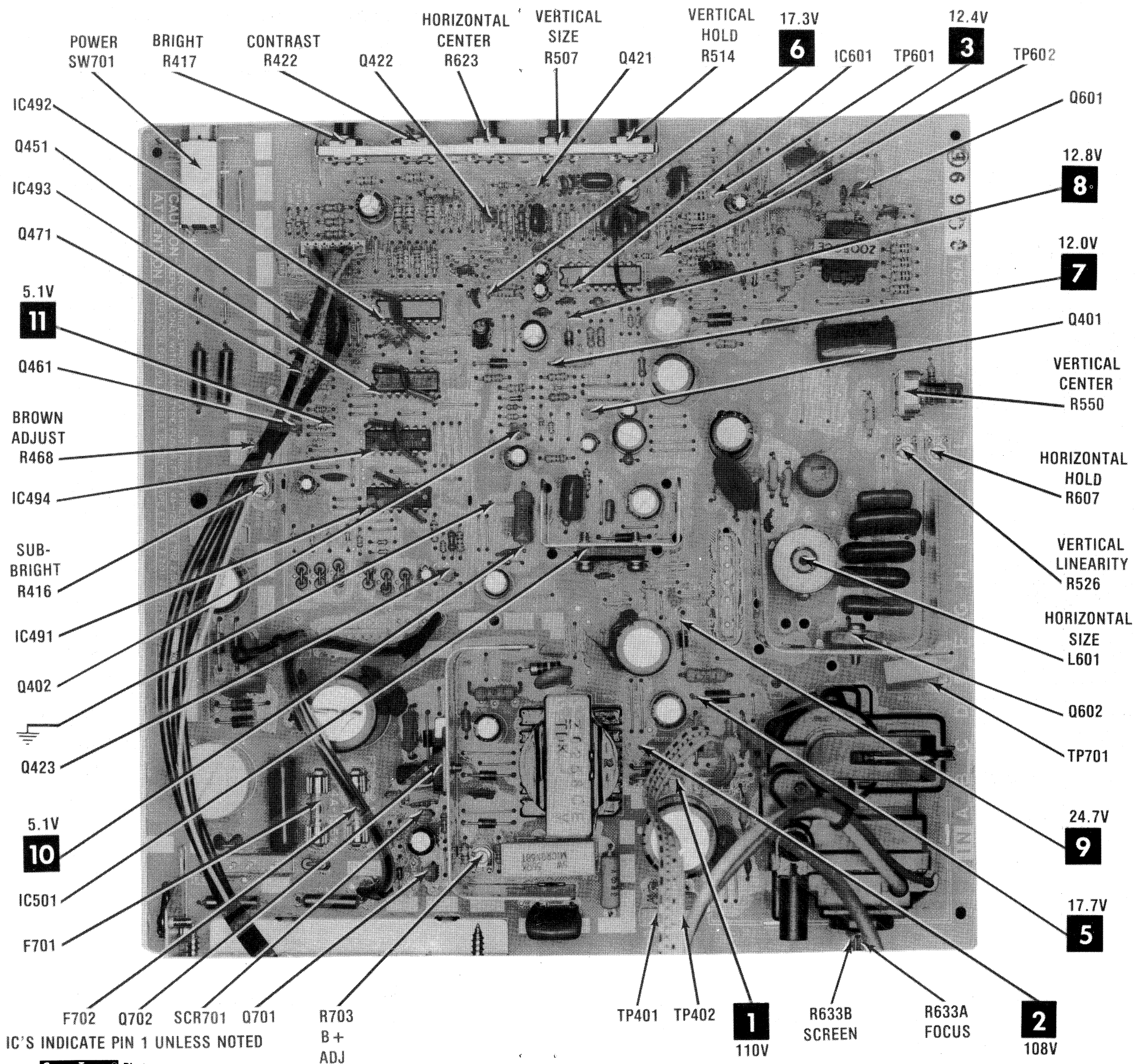
RADIO SHACK
MODEL CM11

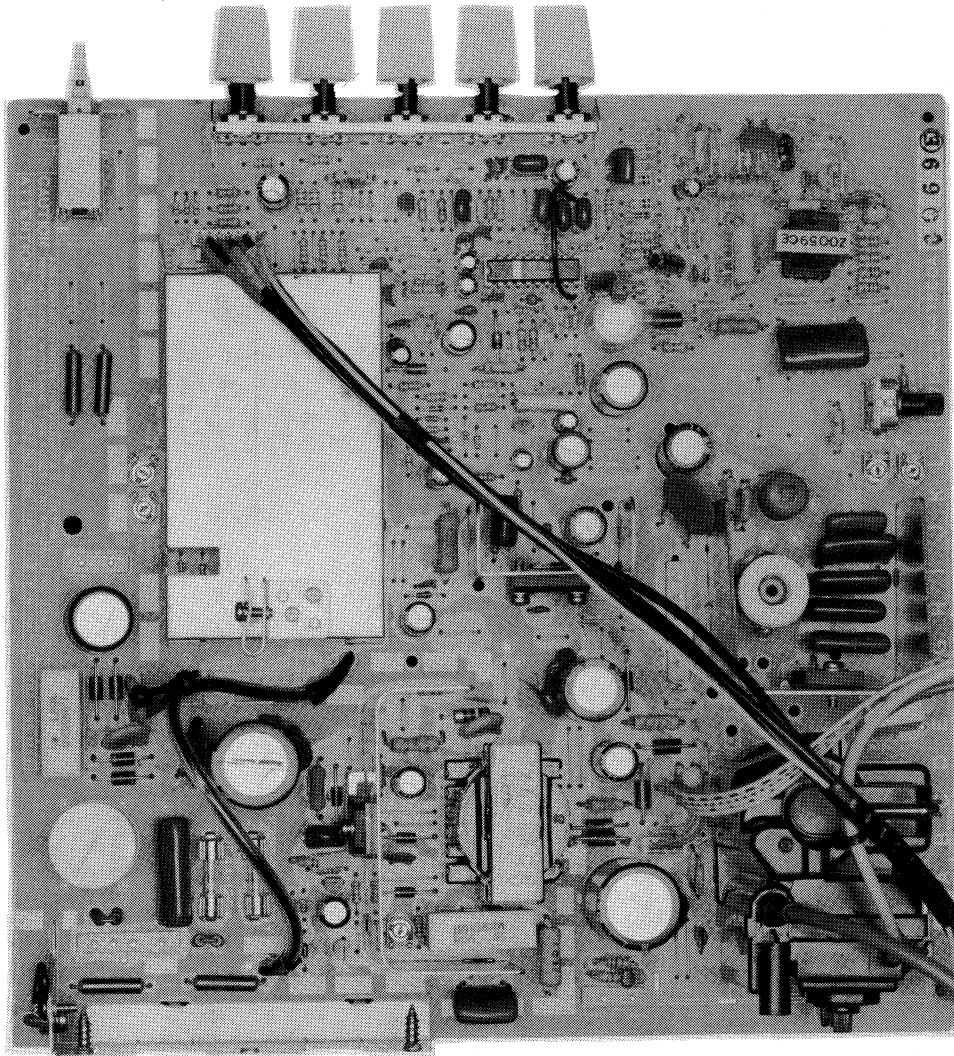
A Howard W. Sams CIRCUITRACE™ Photo

CRT BOARD

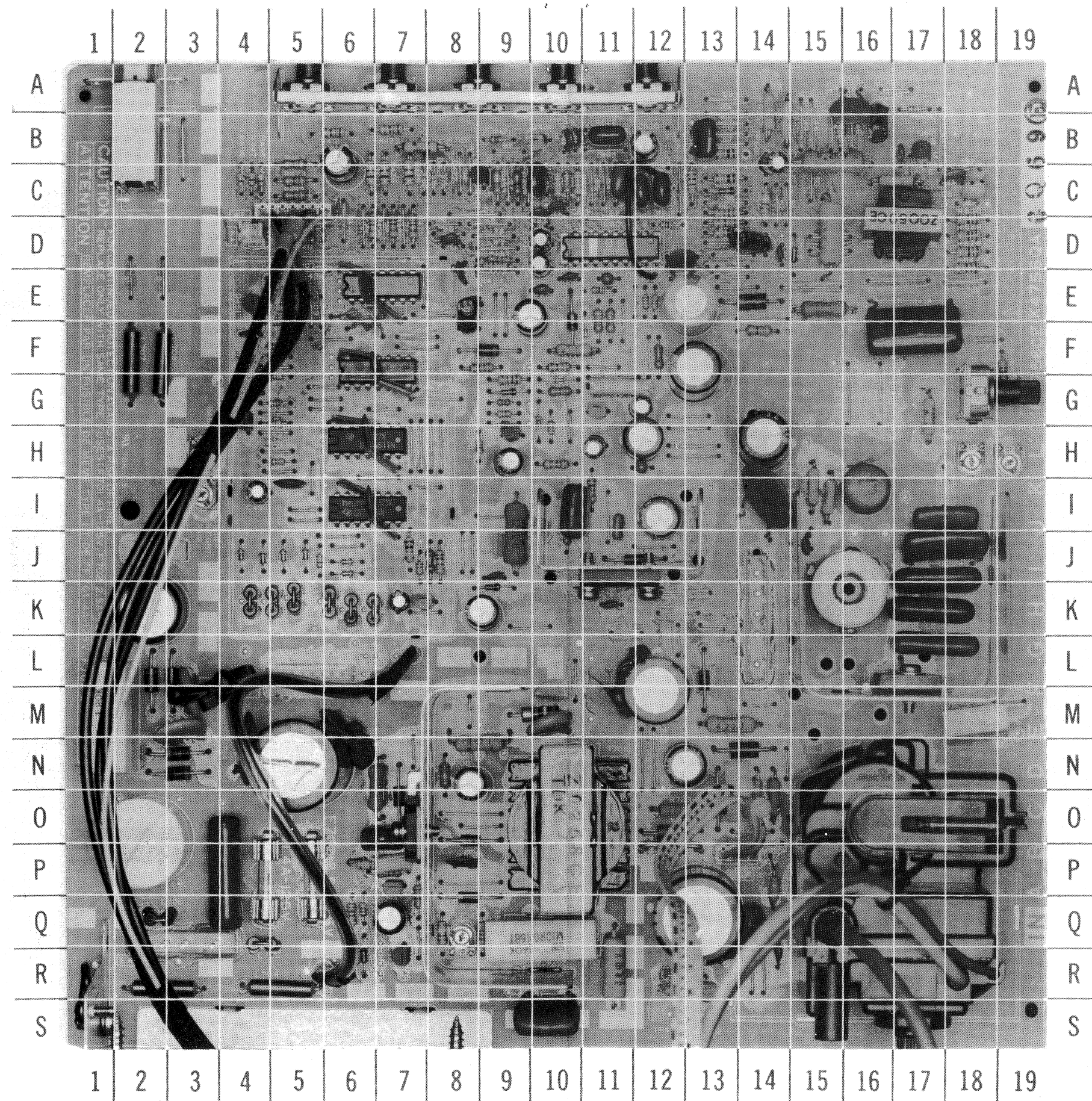
CRT BOARD GridTrace LOCATION GUIDE



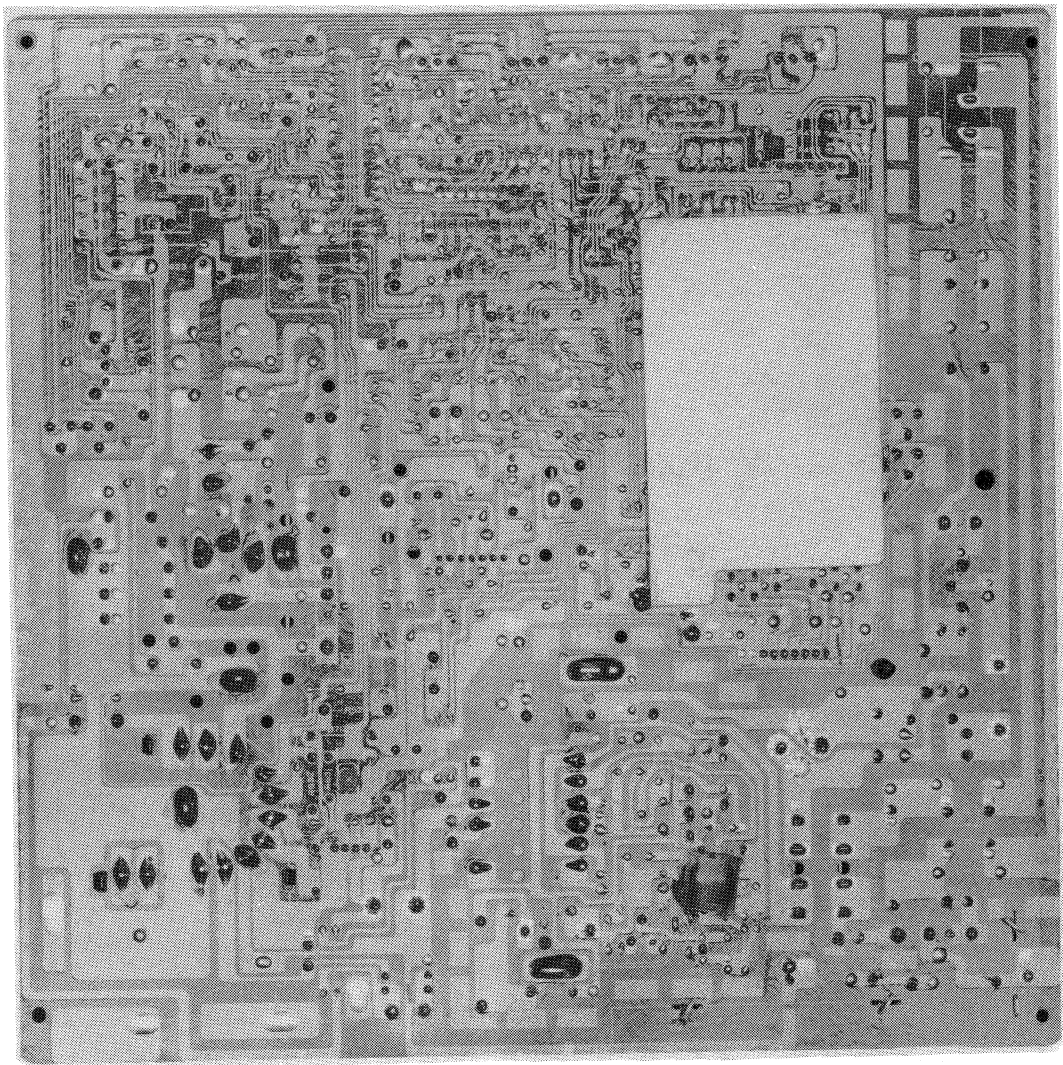




MAIN BOARD SHIELD LOCATION - TOP VIEW

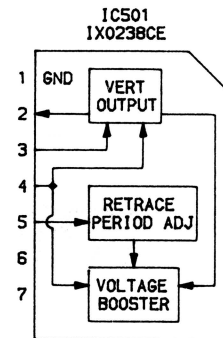
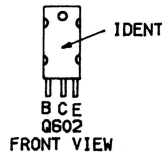
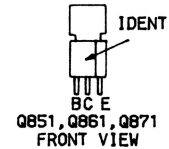
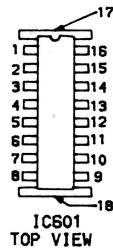
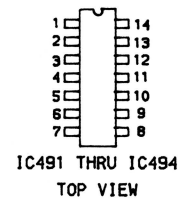
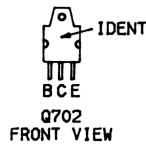


RADIO SHACK
MODEL CM11



MAIN BOARD SHIELD LOCATION - BOTTOM VIEW

IC PINOUTS & TERMINAL GUIDES



SCHEMATIC NOTES

- *— Circuitry not used in some versions
 - Circuitry used in some versions
 - See parts list
 - ⊕ Ground
 - ▽ Common tie point
- Waveforms and voltages are taken from ground, unless noted otherwise.
- Waveforms: triggered scope, RGB pattern generator.
- Item numbers in rectangles appear in the alignment/adjustment instructions.
- Supply voltages maintained as shown at input.
- Voltages measured with digital meter, with signal applied.
- Controls adjusted for normal operation.
- Terminal identification may not be found on unit.
- Capacitors are 50 volts or less, 5% unless noted.
- Electrolytic capacitors are 50 volts or less, 20% unless noted.
- Resistors are ½W or less, 5% unless noted.
- Value in () used in some versions.
- Measurements with switching as shown, unless noted.

SAFETY PRECAUTIONS

SERVICE WARNING

Service work should be performed only by qualified service technicians who are familiar with safety checks and guide lines.

1. For continued safety, no modification of any circuit should be attempted unless recommended by manufacturer.
2. Disconnect power source before replacing parts as some parts may be electrostatic sensitive.
3. Use an isolation transformer between the line cord and power receptacle, when servicing chassis.

SERVICING HIGH VOLTAGE AND PICTURE TUBE

When servicing the High Voltage circuits, extreme caution should be used.

1. Discharge static High Voltage by connecting a 10 kohms resistor in series with a test lead between chassis and anode lead of picture tube.
2. Wear shatter-proof eye protection (goggles) when handling the picture tube in case of implosion.
3. DO NOT lift picture tube by the neck.

X-RAY RADIATION AND HIGH VOLTAGE LIMITS

Service personnel should be aware of the procedures and instructions covering x-ray radiation. The only potential source of x-ray in present day solid state receivers and monitors is the picture tube.

1. It is only when High Voltage is excessive that x-ray radiation is capable of being emitted from shell of picture tube. Be sure the High Voltage is set at specified level.
2. An accurate High Voltage meter should be available at all times. Meter calibration should be checked periodically.
3. High Voltage should be kept at rated value - NO HIGHER. Higher voltages may cause x-ray radiation or failure of other associated components. DO NOT depend on protection circuit to keep voltages at rated value.
4. Every time a chassis is serviced, High Voltage should be checked at various brightness levels to be sure it is regulating properly.
5. While troubleshooting a set with excessive High Voltage, avoid being close to picture tube. DO NOT operate longer than it is necessary to locate the cause of excessive High Voltage. Use a variable AC transformer to regulate voltage.
6. Many components, electrical and mechanical, in present chassis have safety related characteristics which are not evident with visual inspection. When these components are known, they are identified with a # on the schematic and in the parts list. When replacing these components, for SAFETY, use only an equivalent replacement part.

SAFETY CHECKS-FIRE AND SHOCK HAZARD

Cold Leakage Checks (Sets with isolated ground.)

1. Unplug the AC cord and connect a jumper across the two prongs on the plug.
2. Turn on power switch.
3. Measure the resistance, with an Ohm meter, between the jumpered AC plug and any exposed metal cabinet parts on the set such as: antenna screw heads, control shafts, handle brackets. Exposed metal parts that have a return path should measure between 200 kohms and 5 megohm. Parts without a return path must measure infinity.

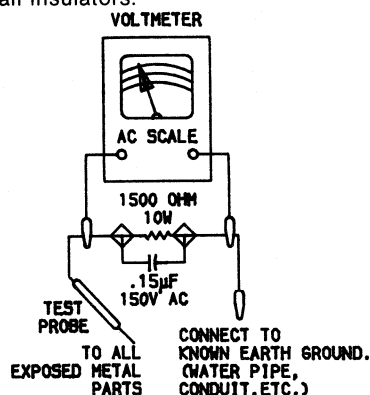
Leakage Current Hot Check

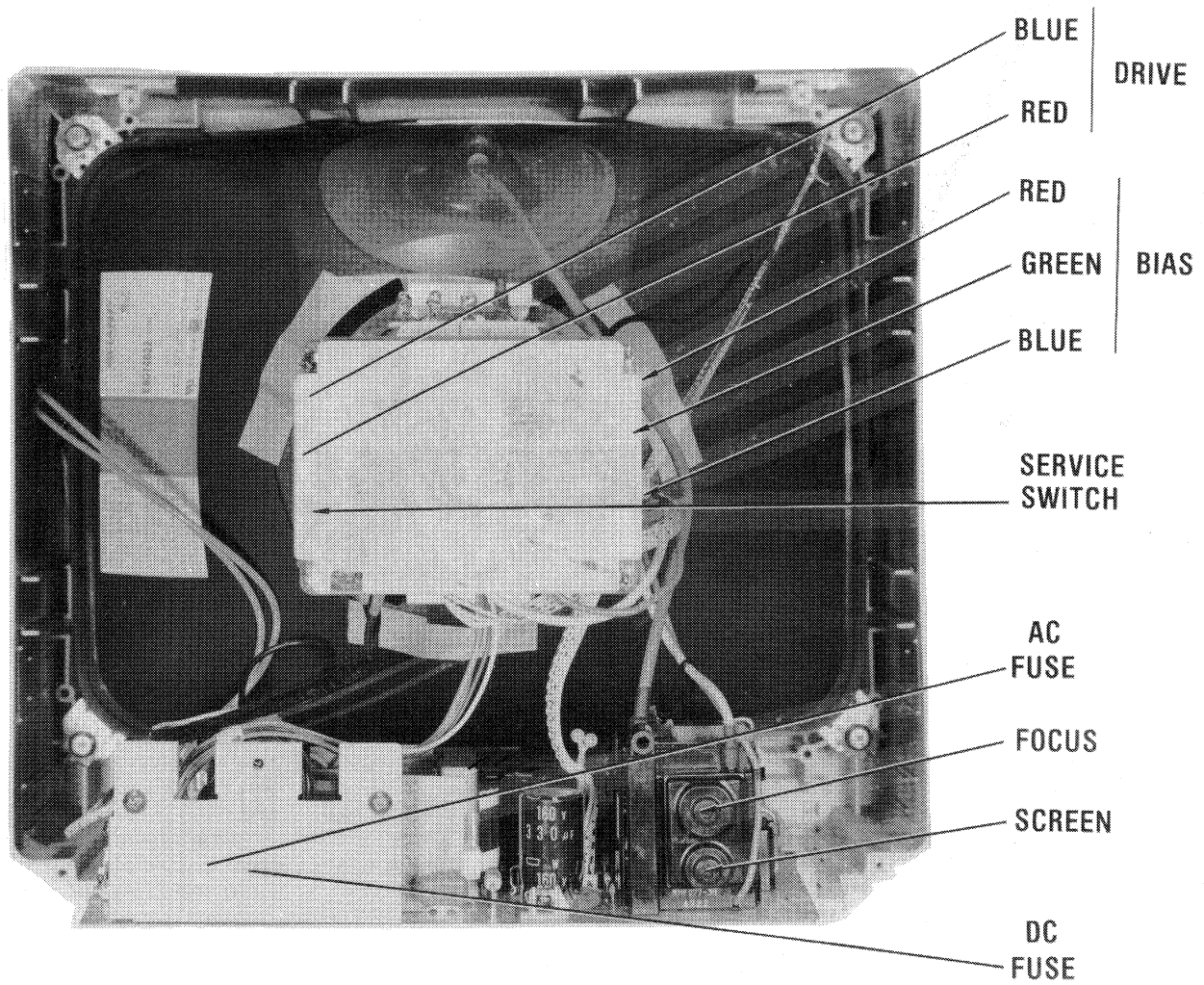
1. Plug the AC cord directly into AC outlet. DO NOT use an isolation transformer.
2. Connect a 1500 Ohm 10 watt resistor, in parallel with a .15 μ F 150V AC capacitor, between any exposed metal parts on the set and a good earth ground such as a water pipe. (See Figure below.)
3. Using an AC volt meter, with 1000 Ohms per volt or more sensitivity, measure the voltage across the resistor. Check each exposed part and measure voltage at each point.
4. Reverse the AC plug and repeat voltage measurement at each point.
5. The voltage at any point should not exceed .75 volts RMS. This corresponds to .5 milliamps AC. Any value exceeding this limit constitutes a potential shock hazard and must be corrected.

GENERAL GUIDE LINES

A final SAFETY check before returning the set to customer.

1. Check area repaired for poorly soldered or de-soldered connections. Check entire circuit board surface for solder splashes.
2. Check interboard wiring for pinched wires or wires contacting any high-wattage resistors.
3. Check that all control knobs, shields, covers, grounds and mounting hardware have been replaced. Be sure to replace all insulators.





CABINET - REAR VIEW

PRELIMINARY SERVICE CHECKS

This data provides the user with a time-saving service tool designed for quick isolation and repair of monitor malfunctions.

Check all interconnecting cables for good connection and correct hook-up before making service checks.

TEST EQUIPMENT AND TOOLS

TEST EQUIPMENT

Digital Volt/Ohm Meter
HV Test Probe
CRT Tester

TOOLS

Phillips Screwdriver
Low Voltage Soldering Iron
Contact Cleaner
Desoldering Tool

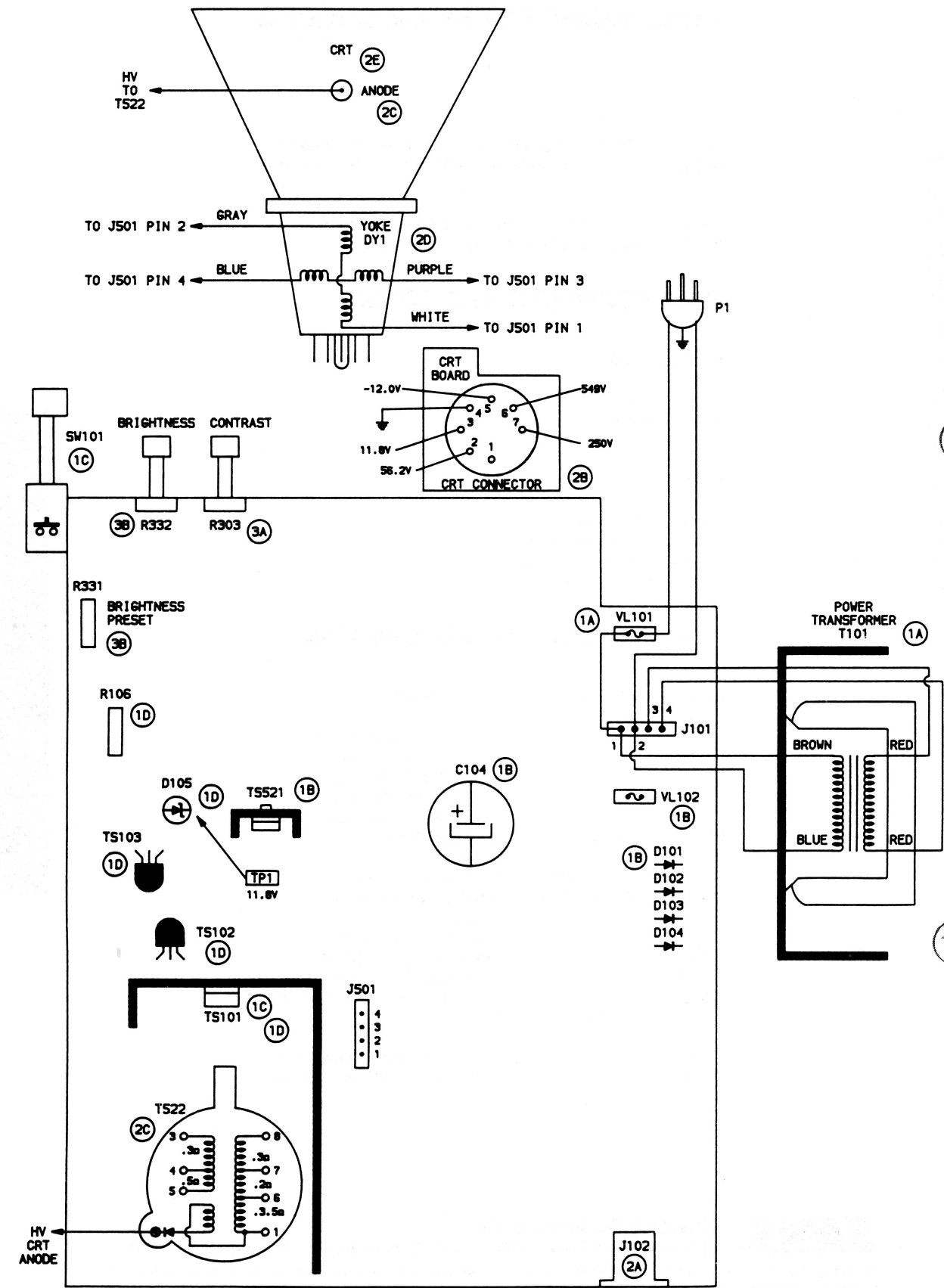
PARTS LIST AND DESCRIPTION

ITEM	PART NO.	DESCRIPTION
C104		Capacitor, 3300 μ F 25V 20%
D101		Diode, Bridge Rectifier
D102		Diode, Bridge Rectifier
D103		Diode, Bridge Rectifier
D104		Diode, Bridge Rectifier
DY1	313810871360	Deflection Yoke
SW101		Power Switch
T101	313810830740	Transformer, Power
T522	313810830760	Transformer, Horizontal Output
TS101		Transistor, Regulator
TS102		Transistor, Error Amplifier
TS103		Transistor, Error Detector
TS521		Transistor, Horizontal Output
V101	MS31-344GR/PD	CRT
VL102		Fuse, .5 Amp 250V Slow Blow
VL102		Fuse, 2 Amp 250V Fast Blow

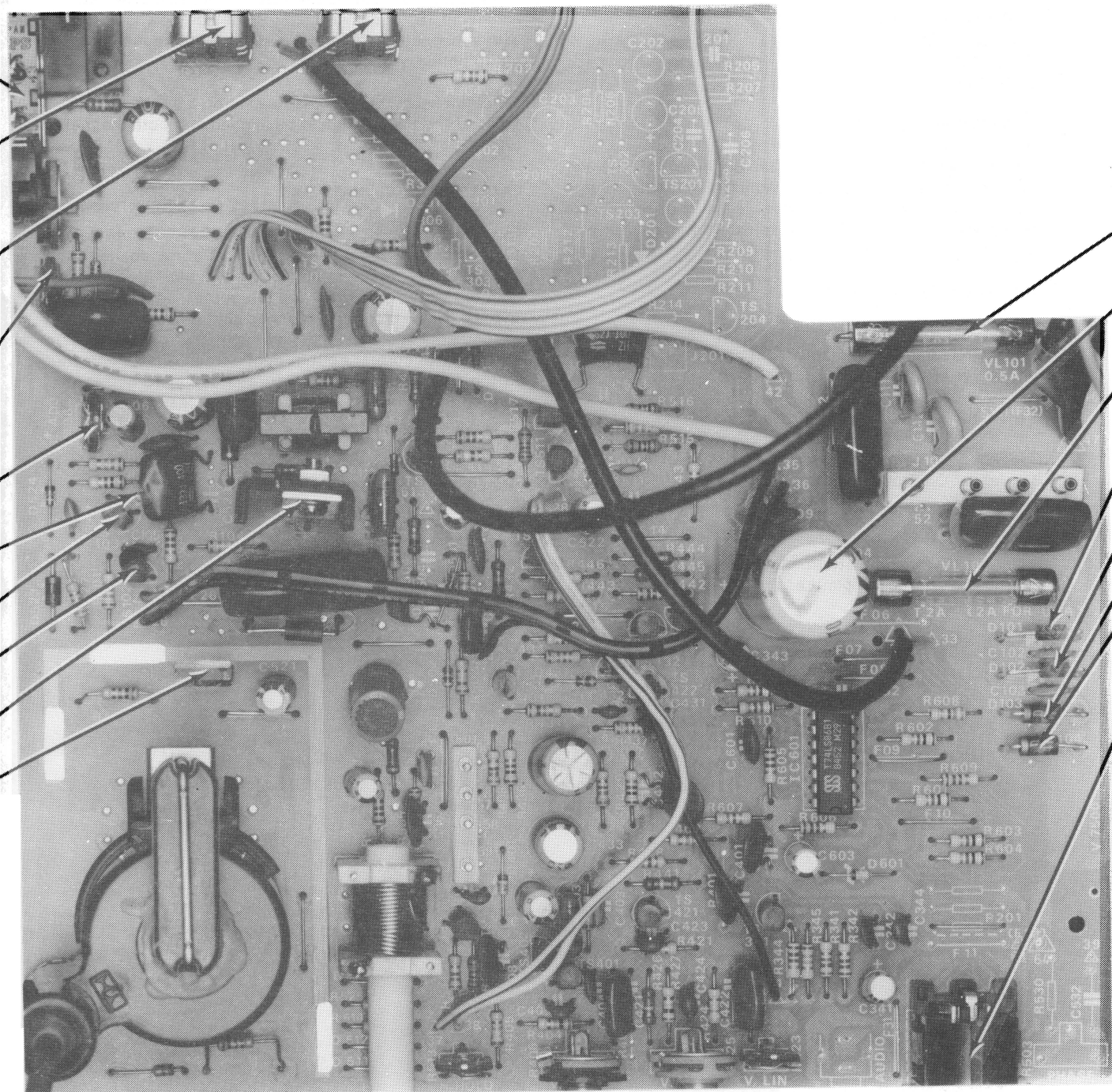
PRELIMINARY SERVICE CHECKS (Continued)

SERVICE CHECKS

MATCH THE NUMBERS ON THE INTERCONNECTING DIAGRAM AND PHOTOS WITH THE NUMBERS ON THE SERVICE CHECKS TO BE PERFORMED.



- 1C POWER SWITCH SW101
- 3B BRIGHTNESS R332
- 3A CONTRAST R303
- 3B BRIGHTNESS PRESET R331
- 1D B+ ADJUST R106
- 1D D105
- 1D TS103
- 1D TS102
- 1B TS521
- 1C 1D TS101



- 1A VL101
- 1B C104
- 1B VL102
- 1B D101
- 1B D102
- 1B D103
- 1B D104
- 2A J102

- 1 POWER SUPPLY
 - (A) Check Fuse VL101. If open check Power Transformer (T101).
 - (B) Check Fuse VL102. If open check Horizontal Output Transistor (TS521), Bridge Rectifier (D101 thru D104), and Capacitor C104.
 - (C) Check for 15.9V at the emitter of Regulator (TS101). If missing check Power Switch (SW101).
 - (D) Check for 11.8V at TP1 (Cathode of D105). If missing or incorrect check for improper adjustment of B+ Adjust (R106), check Transistors TS101, TS102 and TS103, and associated components.
- 2 NO DISPLAY
 - (A) Check for bad connection at the Video Connector J102.
 - (B) Check Yoke (DY1) for 13Ω between pins 3 and 4 of Connector J501. Check for .8Ω between pins 1 and 2 of Connector J501.
 - (C) Check CRT voltages.
 - (D) Check high voltage with HV probe. If incorrect check Horizontal Output Transformer (T522) and associated components.
 - (E) Check CRT with CRT tester.
- 3 POOR CONTRAST AND BRIGHTNESS
 - (A) Clean Contrast Control (R303).
 - (B) Clean Intensity Brightness Control (R332), and Brightness Preset Control (R331).

PRELIMINARY SERVICE CHECKS (Continued)

PREVENTATIVE MAINTENANCE

ENVIRONMENT

Computers perform best in a clean, cool area that is below 80 degrees Fahrenheit and free of dust and smoke particles. Even though home Computers are not affected by cigarette smoke as much as commercial Computers are affected, it is better to maintain a smoke-free area around the Computer. Do not block cabinet vents of Computer, Monitor, Printer, or other power devices.

ELECTRICAL POWER

Variations in the line voltage can affect the Computer. Try to avoid these fluctuations by using an AC receptacle that is on a power line not used by appliances or other heavy current demand devices. A power-surge protector, power-line conditioner, or non-interruptible power supply may be needed to cure the problem. **Do not** switch power On and Off frequently.

KEYBOARD

Liquids spilled into the Keyboard can ruin it. Immediately after a spill occurs, disconnect the Computer power plug from AC power outlet. Then, if circuitry or contacts are contaminated, disassemble the Keyboard and carefully rinse the Keyboard printed circuit board with distilled water and let it dry. Use a cotton swab to clean between the keys. Use a non-abrasive contact cleaner and lint-free wipers on accessible connectors and contacts.

DISK DRIVES

Clean the read/write heads of the Disk Drives about once a month or after 100 hours usage. Use only an approved head cleaning kit.

Handle carefully to preserve proper disk head alignment. A sudden bump or jolt to the Disk Drives can knock the disk head out of alignment. If Disk Drive must be transported, place an old disk in slot and close door during transport.

Store disks in their protective covers and never touch the disk surface. Observe the disk handling precautions usually found on the back of disk protective covers.

PRINTERS

Carefully vacuum the Printer regularly. Wipe surface areas clean using a light all-purpose cleaner. Do not oil the machine. The oil will collect abrasive grit and dust. The dust will act as a blanket. This can cause components to overheat and fail.

STATIC ELECTRICITY

Static electricity discharge can affect the Computer. In order to minimize the possibility, use anti-static mats, sprays, tools and materials, and maintain good humidity in the Computer environment.

MONITOR

Use an isolation transformer with any Monitor that does not come as part of the system since some Monitors use a HOT chassis (chassis connected to one side of the AC line). The face of the Monitor should never be left on for long period of time at high brightness level except when pattern is being changed periodically. Use caution when cleaning anti-glare screens, to preserve the glare-reduction feature.

PRELIMINARY SERVICE CHECKS (Continued)

MISCELLANEOUS ADJUSTMENTS

Note: A crosshatch pattern is required for all adjustments unless noted. Run program below to receive a crosshatch pattern. Change number 7 in line 20 to number 15 for high intensity.

```
10 SCREEN 0,1:WIDTH 80
20 CLS:COLOR 7,0:KEY OFF
30 FOR X = 1 TO 1920
40 PRINT CHR$(197);
50 NEXT X
60 GOTO 60
```

BRIGHTNESS PRESET

Receive a crosshatch pattern. Set Brightness (R332) and Contrast (R303) to minimum. Adjust Brightness Preset (R331) until pattern just becomes visible. Set Brightness and Contrast to Maximum and readjust Brightness Preset if blooming occurs.

VERTICAL LINEARITY

Receive a crosshatch pattern. Adjust Vertical Linearity Control (R423) for proper linearity of pattern at top, bottom and center of screen.

B + ADJUSTMENT

Connect a DC voltmeter to TP1 (Cathode of D105). Adjust B + Adjust Control (R106) for 12.0V.

FOCUS

Receive a crosshatch pattern. Adjust Focus Control (R336) to obtain a sharp clear picture.

PINCUSHION ADJUSTMENT

To correct Pincushion effect on the C.R.T. Raster place a magnet on the yoke mounting pin that corresponds with the affected area. Top Bow is corrected with a magnet at 0° (top center) pin. Left side Bow is corrected with a magnet at 90° clockwise pin. Bottom Bow is corrected with a magnet at 180° clockwise pin. Right side Bow is corrected with a magnet at 270° clockwise pin. Rotate magnets on pin to obtain desired raster.

Note: If a second magnet is needed on any one pin the poles of the magnets must be aligned and both magnets rotated simultaneously.

TRAPEZOIDAL ADJUSTMENT

To correct a trapezoidal effect on the C.R.T. raster place a magnet on the yoke mounting pin that corresponds to the affected area. Place a magnet on the pin 45° clockwise from top center to correct top left corner. Place a magnet on the pin 135° clockwise from top center to correct bottom left corner. Place a magnet on the pin 225° clockwise from top center to correct bottom right corner. Place a magnet on the pin 315° clockwise from top center to correct top right corner. Rotate magnets to obtain desired raster.

Note: If a second magnet is needed on any one pin the poles of the magnet must be aligned and both magnets rotated simultaneously.

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

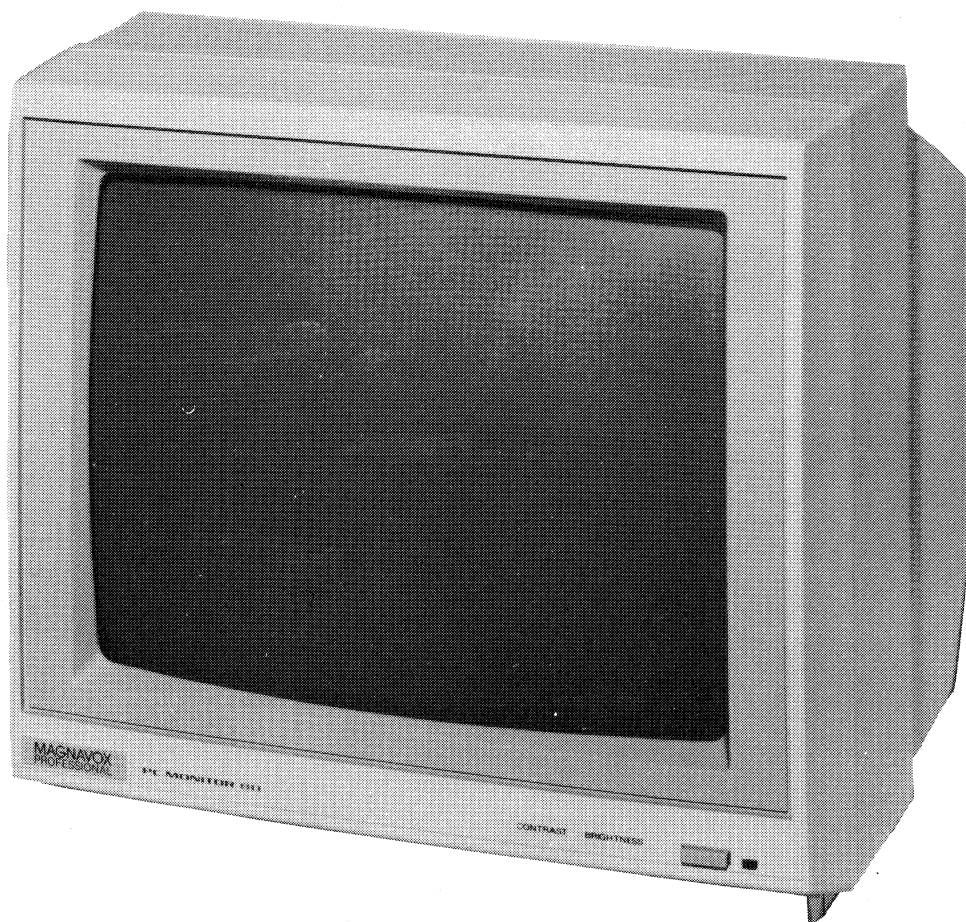
Remove four screws holding cabinet back and remove back. Disconnect HV anode, CRT socket, ground leads J501 and J101. Slide chassis out of cabinet.

CRT REMOVAL

Follow "Chassis Removal" and lay set face down on a soft protective surface. Remove four screws holding CRT to cabinet front and lift CRT out of cabinet. **Do not** lift CRT by neck.

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The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co. as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co. by the manufacturers of the particular type of replacement part listed.

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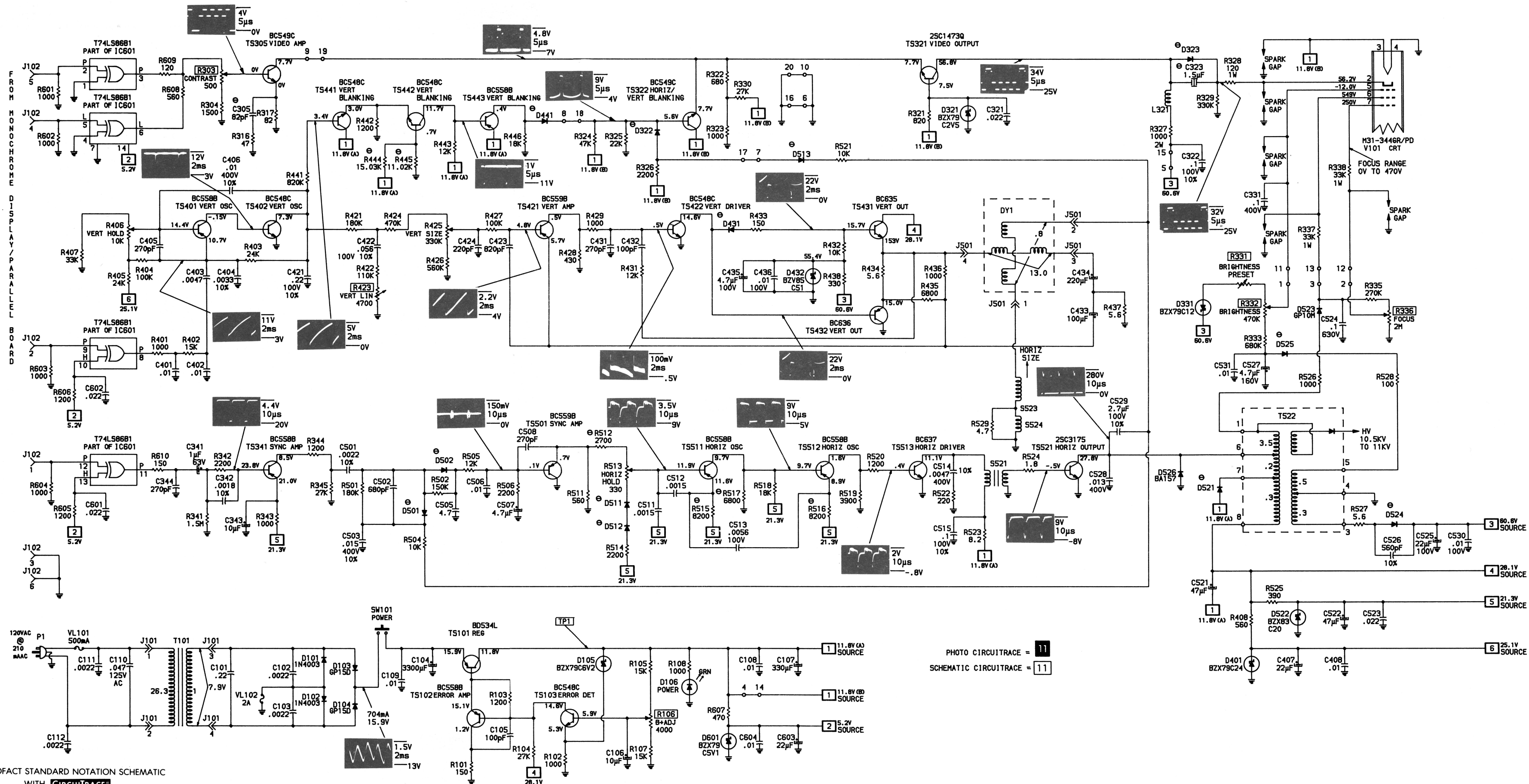
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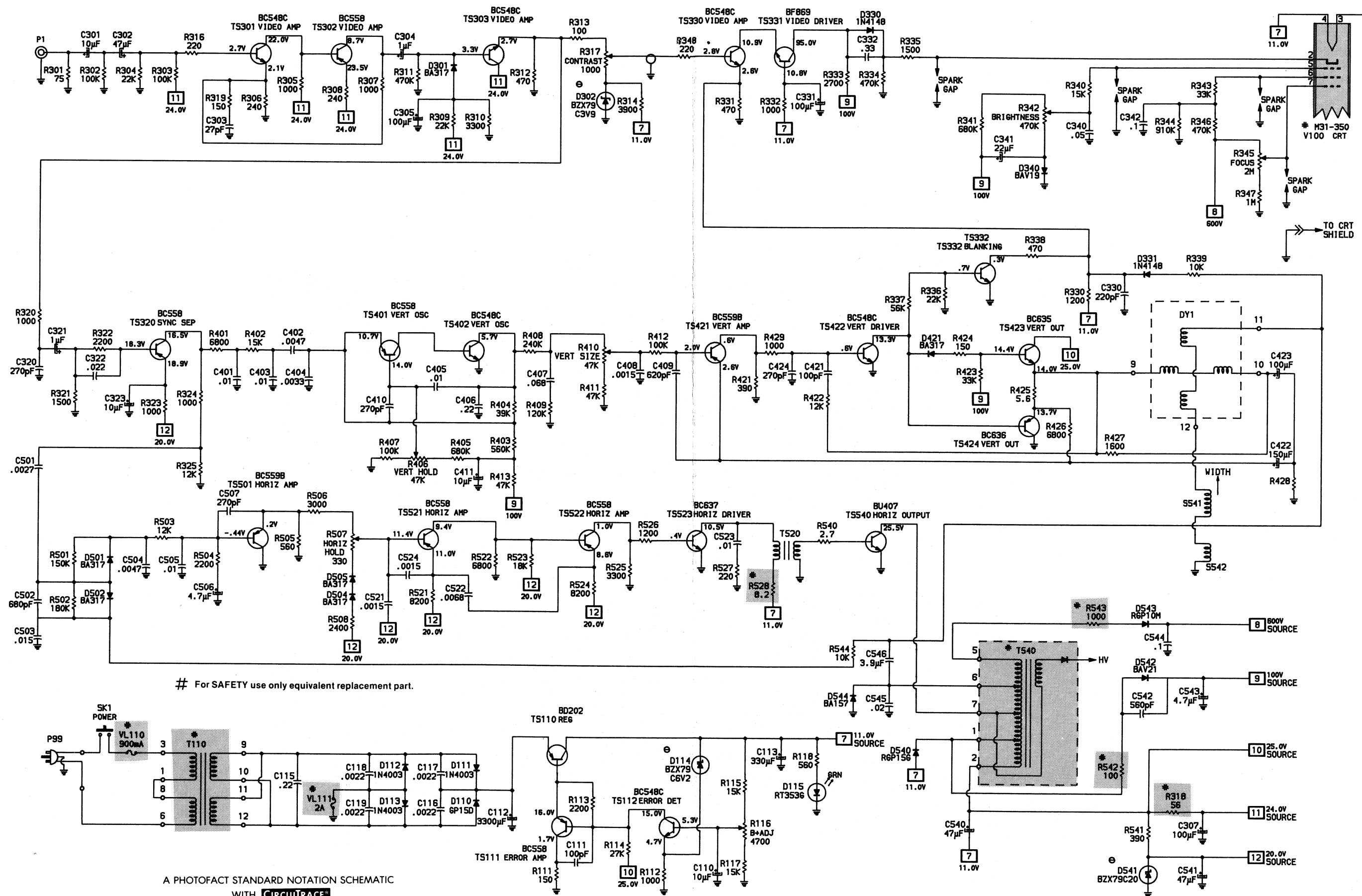
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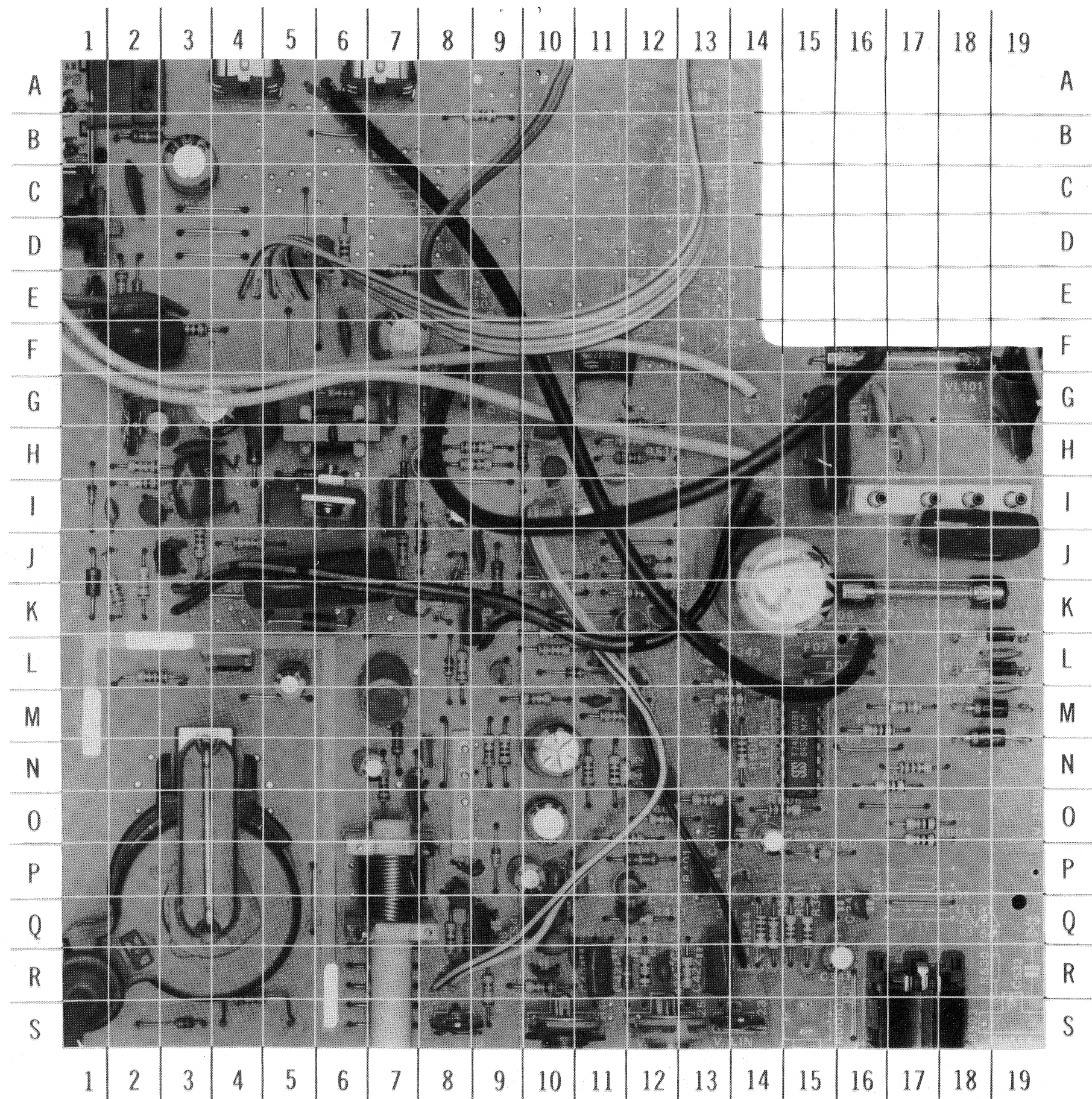
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ALTERNATE MONITOR

ALTERNATE MONITOR

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MAIN BOARD GridTrace LOCATION GUIDE

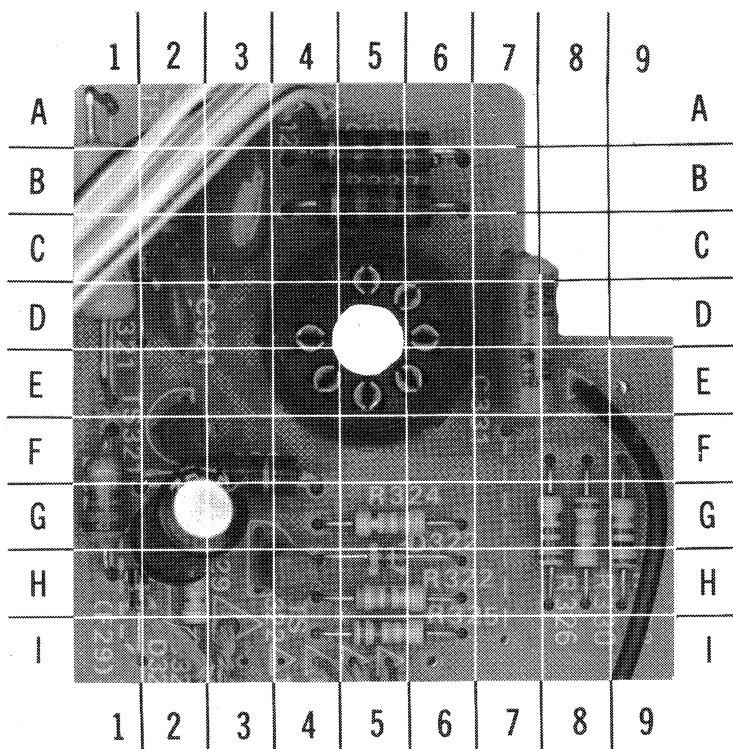
C101	J-18	D511	S-7	R514	R-7
C102	L-19	D512	S-7	R515	H-12
C103	M-19	D513	H-7	R516	G-12
C104	K-16	D521	K-6	R517	H-9
C105	J-3	D523	K-1	R518	H-12
C106	G-2	D524	I-1	R519	H-9
C107	G-4	D525	S-3	R520	H-9
C108	H-3	D526	H-4	R521	J-7
C109	I-14	D601	P-15	R522	G-6
C110	H-15	I0601	N-15	R523	G-6
C111	G-16	J101	I-17	R524	H-5
C112	H-17	J102	S-17	R525	R-7
C305	E-7	J501	O-8	R526	L-2
C341	R-16	R101	J-2	R527	K-2
C342	Q-15	R102	I-2	R528	S-4
C343	L-13	R103	J-3	R529	N-7
C344	Q-16	R104	J-4	R601	N-17
C401	P-13	R105	G-2	R602	M-16
C402	N-12	R106	G-2	R603	O-17
C403	P-11	R107	H-2	R604	O-17
C404	R-10	R108	F-3	R605	N-14
C405	R-10	R303	A-7	R606	O-15
C406	Q-10	R304	B-9	R607	O-13
C407	P-10	R316	E-7	R608	M-17
C408	Q-9	R317	D-6	R609	N-17
C421	R-11	R331	E-1	R610	M-13
C422	R-13	R332	A-4	S521	H-6
C423	O-12	R333	B-2	S523	P-7
C424	R-12	R335	E-2	S524	M-7
C431	M-12	R336	D-1	SW101	A-1
C432	M-11	R341	Q-15	T522	Q-3
C433	O-10	R342	Q-15	TS101	L-4
C434	N-10	R343	I-12	TS102	J-3
C435	I-8	R344	Q-14	TS103	I-2
C436	J-9	R345	Q-14	TS305	D-6
C501	K-9	R401	L-13	TS341	P-14
C502	K-7	R402	O-12	TS401	Q-10
C503	I-7	R403	P-10	TS402	Q-10
C505	N-7	R404	R-10	TS421	P-12
C506	Q-7	R405	R-9	TS422	L-12
C507	N-7	R406	S-10	TS431	L-9
C508	P-9	R407	R-11	TS432	L-11
C511	I-11	R408	N-9	TS441	K-12
C512	H-11	R421	Q-12	TS442	K-12
C513	F-11	R422	R-13	TS443	J-10
C514	G-7	R423	S-14	TS501	P-8
C515	G-5	R424	R-13	TS512	H-10
C521	L-5	R425	S-12	TS513	H-10
C522	I-11	R426	R-11	TS521	I-6
C523	I-11	R427	R-12	VL101	F-17
C524	F-2	R428	O-12	VL102	K-17
C525	F-7	R429	N-11		
C526	I-2	R431	M-10		
C527	B-3	R432	J-9		
C528	I-3	R433	K-10		
C529	K-5	R434	L-10		
C530	F-6	R435	N-11		
C531	C-2	R436	N-9		
C601	M-13	R437	M-11		
O602	M-15	R438	G-8		
C603	O-14	R441	P-12		
O604	O-13	R442	K-12		
D101	L-19	R443	K-10		
D102	L-19	R444	J-12		
D103	M-19	R445	J-12		
D104	N-19	R446	J-10		
D105	I-3	R501	K-8		
D331	E-2	R502	L-8		
D401	P-9	R504	J-8		
D431	L-10	R505	O-7		
D432	G-8	R506	N-7		
D441	F-9	R511	Q-8		
D501	K-8	R512	Q-8		
D502	L-8	R513	S-8		

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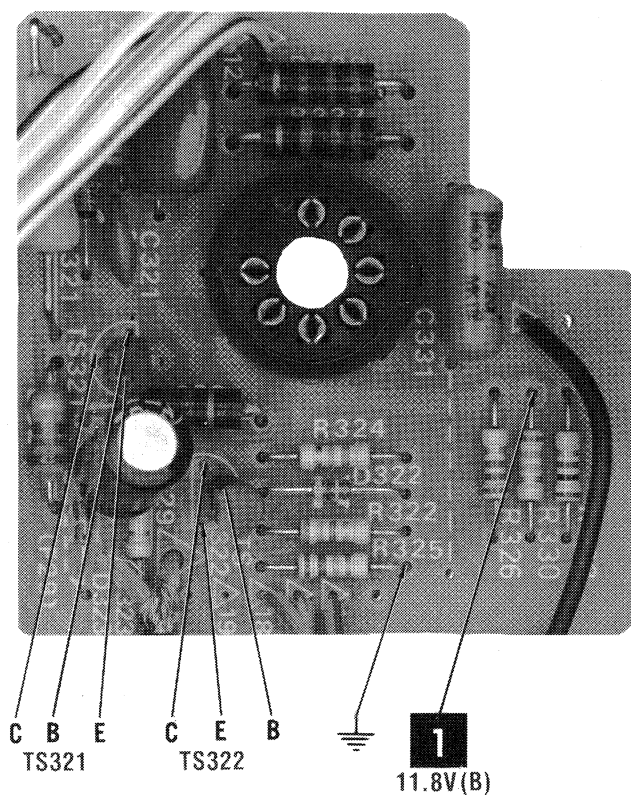


CRT BOARD **GridTrace LOCATION GUIDE**

C321	D-2
C322	B-3
C323	G-2
C331	E-7
D321	C-2
D322	H-5
D323	H-1
L321	G-1
R321	B-3
R322	H-5
R323	G-9
R324	G-5
R325	I-5
R326	G-8
R327	C-1
R328	F-3
R329	H-2
R330	G-8
R337	B-5
R338	B-5
TS321	F-2
TS322	H-4



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CRT BOARD

∞ PARTS LIST AND DESCRIPTION

When ordering parts, state Model, Part Number, and Description

SEMICONDUCTORS (Select replacement for best results)

ITEM No.	TYPE No.	MFR. PART No.	REPLACEMENT DATA				NOTES
			NTE PART No.	ECG PART No.	RCA PART No.	ZENITH PART No.	
D101,2 D103,4 D105 D321 D322	1N4003 GP15D BZX79C6V2 BZX79C2V5		NTE116 NTE125 NTE5013A	ECG116 ECG125 ECG5013A	SK3311 SK3081/125 SK6A2/5013A	212-76-02 212-Z9000 103-Z9008	
D323 D331 D401 D431 D432	BZX79C12 BZX79C24 BZX85C51		NTE5021A NTE5081A NTE5089A	ECG5021A ECG5081A ECG5089A	SK12A/5021A SK24V/5081A SK51V/5089A	103-279-21 103-Z9000 103-Z9025	
D441 D501 D502 D511,12 D513			NTE177 NTE177 NTE519	ECG177 ECG177 ECG519	SK9091/177 SK9091/177 SK3100/519	103-131 103-131 103-131	
D521 D522 D523 D524 D525 D526	GP15G BZX83C20 GP10M BA157		NTE125 NTE5079A NTE125	ECG125 ECG5079A ECG125	SK3081/125 SK20V/5079A SK3081/125	212-Z9000 103-Z9023 212-Z9000	
D601 IC601 TS101 TS102 TS103	BZX79C5V1 T74LS86B1 BD534L (B)C558B (B)C548C		NTE558 NTE5010A NTE74LS86 NTE153 NTE159+ NTE123AP+	ECG558 ECG5010A ECG74LS86 ECG153 ECG159+ ECG123AP+	SK3998/558 SK5A1/5010A SK74LS86 SK3274/153 SK3466/159+ SK3854/123AP+	103-279-10 HE-443-891 121-988-03 121-Z9003+ 121-Z9000A+	
TS305 TS321 TS322 TS341 TS401	(B)C549C (2S)C1473Q (B)C549C (B)C558B (B)C558B		NTE199* NTE399 NTE199* NTE159+ NTE159+	ECG199* ECG399 ECG199* ECG159+ ECG159+	SK3245/199* SK9352/399 SK3245/199* SK3466/159+ SK3466/159+	121-972* 121-Z9045* 121-972* 121-Z9003+ 121-Z9003+	

PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

SEMICONDUCTORS (Select replacement for best results)

ITEM No.	TYPE No.	MFR. PART No.	REPLACEMENT DATA				NOTES
			NTE PART No.	ECG PART No.	RCA PART No.	ZENITH PART No.	
TS402	(B)C548C		NTE123AP+	ECG123AP+	SK3854/123AP+	121-Z9000A+	
TS421	(B)C559B		NTE159+	ECG159+	SK3466/159+	121-Z9003+	
TS422	(B)C548C		NTE123AP+	ECG123AP+	SK3854/123AP+	121-Z9000A+	
TS431	(B)C635		NTE382*	ECG382*	SK9137/382*	921-1114*	
TS432	(B)C636		NTE383*	ECG383*	SK9138/383*	921-1115*	
TS441,2	(B)C548C		NTE123AP+	ECG123AP+	SK3854/123AP+	121-Z9000A+	
TS443	(B)C558B		NTE159+	ECG159+	SK3466/159+	121-Z9003+	
TS501	(B)C559B		NTE159+	ECG159+	SK3466/159+	121-Z9003+	
TS511,2	(B)C558B		NTE159+	ECG159+	SK3466/159+	121-Z9003+	
TS513	(B)C637		NTE297*	ECG297*	SK3449/297*	921-340*	
TS521	(2S)C3175		NTE379	ECG379	SK9085/379	121-Z9111	

For SAFETY use only equivalent replacement part.

+ Rotate 180° to conform with original lead configuration.

* Lead configuration may vary from original.

CMT13-2

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⚙️ PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

SEMICONDUCTORS (Select replacement for best results)

ITEM No.	TYPE No.	MFG. PART No.	REPLACEMENT DATA					NOTES
			NTE PART No.	ECG PART No.	RCA PART No.	ZENITH PART No.		
D110 Thru D113 D301 D302 D330,1 D340 D421 D501,2 D504,5 D540	ALTERNATE MONITOR GP15D 1N4003 BZX79C6V2 BA317 BZX79C3V9 1N4148 BAV19 BA317 BA317 BA317 RGF15G BZX79C20 BAV21 RGP10M BA157 BD202 BC558 BC548C BC548C BC558 BC548C BC548C BF869 BC548C BC558 BC548C BC559B		NTE125 NTE116	ECG125 ECG116	SK3081/125 SK3311	212-Z9000 212-76-02		
			NTE5013A NTE519 NTE5007A	ECG5013A ECG519 ECG5007A	SK6A2/5013A SK3100/519 SK3A9/5007A	103-Z9008 103-131		
			NTE519 NTE519 NTE519 NTE519 NTE519 NTE580	ECG519 ECG519 ECG519 ECG519 ECG519 ECG580	SK3100/519 SK3100/519 SK3100/519 SK3100/519 SK3100/519 SK5036/580	103-131 103-131 103-131 103-131 103-131 212-Z9000		
			NTE5079A NTE177 NTE558 NTE558 NTE332 NTE159+	ECG5079A ECG177 ECG558 ECG558 ECG332 ECG159+	SK20V/5079A SK9091/177 SK3998/558 SK3998/558 SK9236/332 SK3466/159+	103-Z9023 103-131 121-Z9003+		
			NTE123AP+ NTE123AP+ NTE159+ NTE123AP+ NTE159+ NTE123AP+	ECG123AP+ ECG123AP+ ECG159+ ECG123AP+ ECG159+ ECG123AP+	SK3854/123AP+ SK3854/123AP+ SK3466/159+ SK3854/123AP+ SK3466/159+ SK3854/123AP+	121-Z9000A+ 121-Z9000A+ 121-Z9003+ 121-Z9000A+ 121-Z9003+ 121-Z9000A+		
			NTE157 NTE123AP+ NTE159+ NTE123AP+ NTE159+	ECG157 ECG123AP+ ECG159+ ECG123AP+ ECG159+	SK3747/157 SK3854/123AP+ SK3466/159+ SK3854/123AP+ SK3466/159+	121-Z9016 121-Z9000A+ 121-Z9003+ 121-Z9000A+ 121-Z9003+		

PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

SEMICONDUCTORS (Select replacement for best results)

ITEM No.	TYPE No.	MFG. PART No.	REPLACEMENT DATA				NOTES
			NTE PART No.	ECG PART No.	RCA PART No.	ZENITH PART No.	
TS422 TS423 TS424 TS501	BC548C BC635 BC636 BC559B		NTE123AP+ NTE382* NTE383* NTE159+	ECG123AP+ ECG382* ECG383* ECG159+	SK3854/123AP+ SK9137/382* SK9138/383* SK3466/159+	121-Z9000A+ 921-1114* 921-1115* 121-Z9003+	
TS521, 2 TS523 TS540	BC558 BC637 BU407		NTE159+ NTE297* NTE379	ECG159+ ECG297* ECG379	SK3466/159+ SK3449/297* SK9085/379	121-Z9003+ 921-340* 121-Z9111	

- * Lead configuration may vary from original.
- + Rotate 180° to conform with original lead configuration.

WIRING DATA

High Voltage Lead	Use BELDEN No. 9867 (30 KV)
Shielded Hook-up Wire	Use BELDEN No. 8401 or 8421 (Single-Conductor)
General-use Unshielded Hook-up Wire	8208 (Two-Conductor)
	8529 (Solid) Available in 13 Colors
	8522 (Stranded) Available in 13 Colors

PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

CAPACITORS

ITEM No.	RATING	MFGR. PART No.
C305	82 NPO 50V 5%	

RESISTORS (Power and Special)

ITEM No.	RATING	REPLACEMENT DATA		
		MFGR. PART No.	NTE PART No.	WORKMAN PART No.
R444	15.03K 1% 1/2W Metal Film			
R445	11.02K 1% 1/2W Metal Film			
R512	2700 1% 1/2W Metal Film			
R515	8200 1% 1/2W Metal Film			
R516	8200 1% 1/2W Metal Film			
R517	6800 1% 1/2W Metal Film			

CONTROLS (All wattages 1/2 watt, or less, unless listed)

ITEM NO.	FUNCTION	RESISTANCE	MFGR. PART NO.	NOTES
R106	+B Adjust	4000		
R303	Contrast	500		
R331	Bright Preset			
R332	Brightness	470K		
R336	Focus	2M		
R406	Vertical Hold	10K		
R423	Vertical Linearity	4700		
R425	Vertical Size	330K		
R513	Horizontal Hold	330		

COILS (RF-IF)

ITEM No.	FUNCTION	MFGR. PART No.
L321	RF Choke	
S523	Horizontal Size	

ITEM No.	FUNCTION	MFGR. PART No.
S524	Linearity	

COILS & TRANSFORMERS

ITEM No.	FUNCTION	MFGR. PART No.	OTHER IDENTIFICATION	NOTES
DY1	Yoke Horiz .334mH		3138 108 71360	(1) Number on unit.
S521	90° Vert 25.3mH			
T101	Horiz Drive			
T522	Power		3138 108 30740(1)	
	Horiz Output		3138 108 30670(1)	

FUSE DEVICES

ITEM NO.	DESCRIPTION	MFGR. PART NO.		NOTES
		DEVICE	HOLDER	
VL101	.5 Amp @ 250V			
VL102	Slow Blow			
	2 Amp @ 250V			
	Fast Blow			

PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

MISCELLANEOUS

ITEM No.	PART NAME	MFGR. PART No.	NOTES
D106 SW101 V101	LED Switch CRT	M31-344GR/PD	Power, Grn Power

TEST EQUIPMENT

Test Equipment listed by Manufacturer illustrates typical or equivalent equipment used by SAMS' Engineers to obtain measurements and is compatible with most types used by field service technicians.

TEST EQUIPMENT (COMPUTERFACTS)

Equipment	B & K Precision Equipment No.	Sencore Equipment No.	Notes
OSCILLOSCOPE	1570A,1590A,1596	SC61	
LOGIC PROBE	DP51,DP21		
LOGIC PULSER	DP101,DP31		
DIGITAL VOM	2830,2806	DVM37,DVM56,SC61	
ANALOG VOM	277,111,116		
ISOLATION TRANSFORMER	TR110,1604,1653,1655	PR57	
FREQUENCY COUNTER	1803,1805	FC71,SC61	
COLOR BAR GENERATOR	1211A,1251,1260,1249	CG25,VA62	
RGB GENERATOR	1260,1249		
FUNCTION GENERATOR	3020,3011,3030		
HI-VOLTAGE PROBE VOM/DMM Accessory probes	HV-44 PR-28(HV)	HP200	
TEMPERATURE PROBE	TP-28,TP-30		
CRT ANALYZER	467,470	CR70	
DIGITAL IC TESTER	560,550,552		
CAPACITANCE ANALYZER		LC53,LC75,LC76 LC77	
INDUCTANCE ANALYZER		LC53,LC75,LC76 LC77	

MAGNAVOX
MODEL 7BM613074G

TROUBLESHOOTING

POWER SUPPLY

Check AC Line Fuse (VL101) and DC Fuse (VL102). If Fuse VL101 is open, check Power Transformer (T101). Also check for possible shorts in Capacitors C110, C111, and C112. If Fuse VL102 is open check Horizontal Output Transistor (TS521) and associated components for shorts. Also check Bridge Rectifier Diodes (D101 thru D104) and Electrolytic (C104) for possible shorts. Check for 15.9V at the cathode of D103. If voltage is incorrect check Diodes D101 thru D104. Check for 15.9V at the emitter of Regulator Transistor (TS101). If voltage is missing check Power Switch (SW101). Check for 11.8V at TP1 (cathode of D105). If voltage is incorrect or missing check for proper adjustment of B+ Adjust (R106), refer to "Miscellaneous Adjustments" section. Also check voltages and components associated with Regulator Transistor (TS101), Error Amp Transistor (TS102) and the Error Detector Transistor (TS103).

HORIZONTAL

Inject a horizontal drive signal at the base of Horizontal Output Transistor (TS521). If horizontal deflection returns check voltages, waveforms and components associated with Horizontal Oscillator Transistors (TS511 and TS512) and Horizontal Driver Transistor (TS513). If horizontal sweep does not return, check voltages, waveforms and components associated with Transistor TS521 and Transformer T522. The High Voltage Rectifier is part of Transformer T522, and if defective will affect the operation of the horizontal circuits. Check Diodes D524, D523, D525, D522, D401 and associated components for defects. Linearity or width problems may be caused by defective Capacitors C528 and C529, and Horizontal Size Coil (S523) and Coil S524.

VIDEO

Check waveform at pin 2 of CRT. If waveform is present check voltages and components associated with pins 2, 3, 4, 5, 6, 7 of CRT and check condition of CRT. If waveform at pin 2 of CRT is missing, check waveform at emitter of Video

Output Transistor (TS321). If waveform is present, check Transistor TS321 and associated components. If waveform at Transistor TS321 is missing check waveform at base of Video Amp Transistor (TS305). If waveform at Transistor TS305 is present, check Transistor TS305 and associated components. If waveform is missing check Contrast Control (R303) and associated components. Also check logic and voltage readings at pins 1, 2, 3, 4, 5, 6, 7 and 14 of IC601. If logic readings are incorrect check IC601 and Connector J102. If there is no vertical blanking, check voltages, waveforms and components associated with Vertical Blanking Transistors (TS441, TS442, TS443). If horizontal blanking is missing, check Diodes D513 and D322. If both horizontal and vertical blanking are missing check Horizontal/Vertical Blanking Transistor (TS322).

VERTICAL

If there is no vertical sweep, inject a vertical signal at base of Vertical Amplifier (TS421). If vertical deflection returns, check voltages, waveforms, and components associated with Vertical Oscillator Transistors (TS401, TS402). If vertical deflection does not return, check voltages, waveforms, and components associated with Vertical Driver Transistor (TS422), Vertical Output Transistors (TS431, TS432) and Vertical Amp (TS421). Vertical linearity or foldover problems may be caused by vertical feedback and bias circuits. Also check the vertical winding of the Deflection Yoke (DY1) and associated circuitry.

SYNC

If vertical sync is missing check logic readings, voltages and components associated with pins 7, 8, 9, 10 and 14 of IC601. If the logic readings are incorrect check IC601 and Connector J102. If horizontal sync is missing, check logic readings, voltages and components associated with pins 7, 11, 12, 13, 14 of IC601. If logic readings are incorrect check IC601 and Connector J102. If logic readings are correct check Electrolytic C341 and Diodes D501 and D502. Also check voltages, waveforms and components associated with Sync Amp Transistors (TS501, TS341).

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

Remove four screws holding cabinet back and remove back. Disconnect HV anode, CRT socket, ground leads J501 and J101. Slide chassis out of cabinet.

CRT REMOVAL

Follow "Chassis Removal" and lay set face down on a soft protective surface. Remove four screws holding CRT to cabinet front and lift CRT out of cabinet. **Do not** lift CRT by neck.



MISCELLANEOUS ADJUSTMENTS

Note: A crosshatch pattern is required for all adjustments unless noted. Run program below to receive a crosshatch pattern. Change number 7 in line 20 to number 15 for high intensity.

```
10 SCREEN 0,1:WIDTH 80
20 CLS:COLOR 7,0:KEY OFF
30 FOR X=1 TO 1920
40 PRINT CHR$(197);
50 NEXT X
60 GOTO 60
```

BRIGHTNESS PRESET

Receive a crosshatch pattern. Set Brightness (R332) and Contrast (R303) to minimum. Adjust Brightness Preset (R331) until pattern just becomes visible. Set Brightness and Contrast to Maximum and readjust Brightness Preset if blooming occurs.

VERTICAL LINEARITY

Receive a crosshatch pattern. Adjust Vertical Linearity Control (R423) for proper linearity of pattern at top, bottom and center of screen.

B+ ADJUSTMENT

Connect a DC voltmeter to TP1 (Cathode of D105). Adjust B+ Adjust Control (R106) for 12.0V.

FOCUS

Receive a crosshatch pattern. Adjust Focus Control (R336) to obtain a sharp clear picture.

PINCUSHION ADJUSTMENT

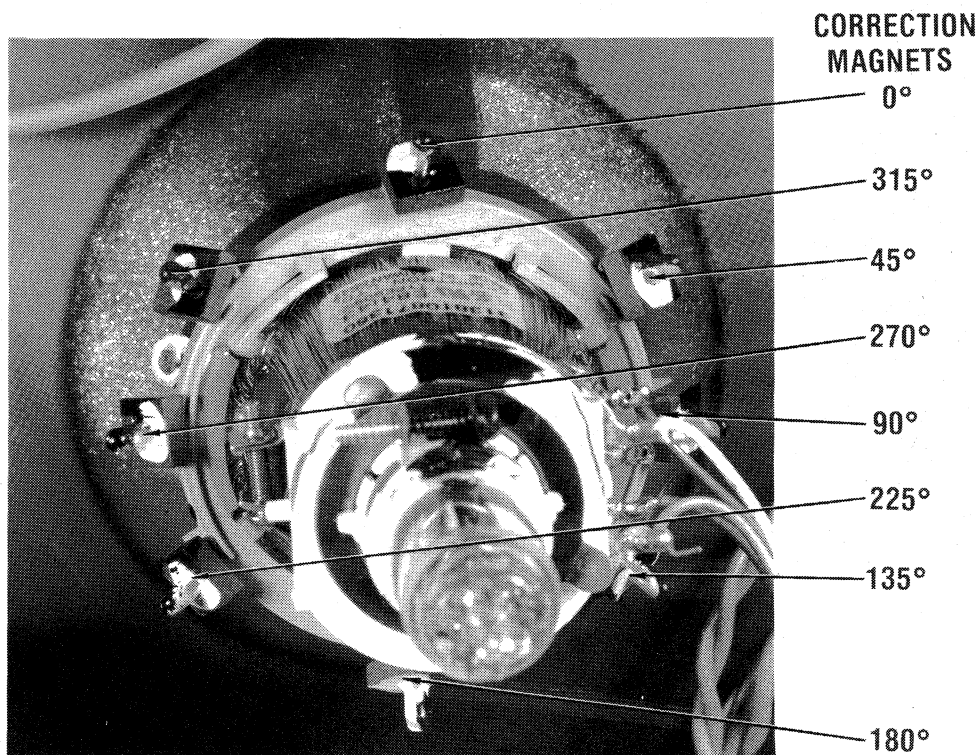
To correct Pincushion effect on the C.R.T. Raster place a magnet on the yoke mounting pin that corresponds with the affected area. Top Bow is corrected with a magnet at 0° (top center) pin. Left side Bow is corrected with a magnet at 90° clockwise pin. Bottom Bow is corrected with a magnet at 180° clockwise pin. Right side Bow is corrected with a magnet at 270° clockwise pin. Rotate magnets on pin to obtain desired raster.

Note: If a second magnet is needed on any one pin the poles of the magnets must be aligned and both magnets rotated simultaneously.

TRAPEZOIDAL ADJUSTMENT

To correct a trapezoidal effect on the C.R.T. raster place a magnet on the yoke mounting pin that corresponds to the affected area. Place a magnet on the pin 45° clockwise from top center to correct top left corner. Place a magnet on the pin 135° clockwise from top center to correct bottom left corner. Place a magnet on the pin 225° clockwise from top center to correct bottom right corner. Place a magnet on the pin 315° clockwise from top center to correct top right corner. Rotate magnets to obtain desired raster.

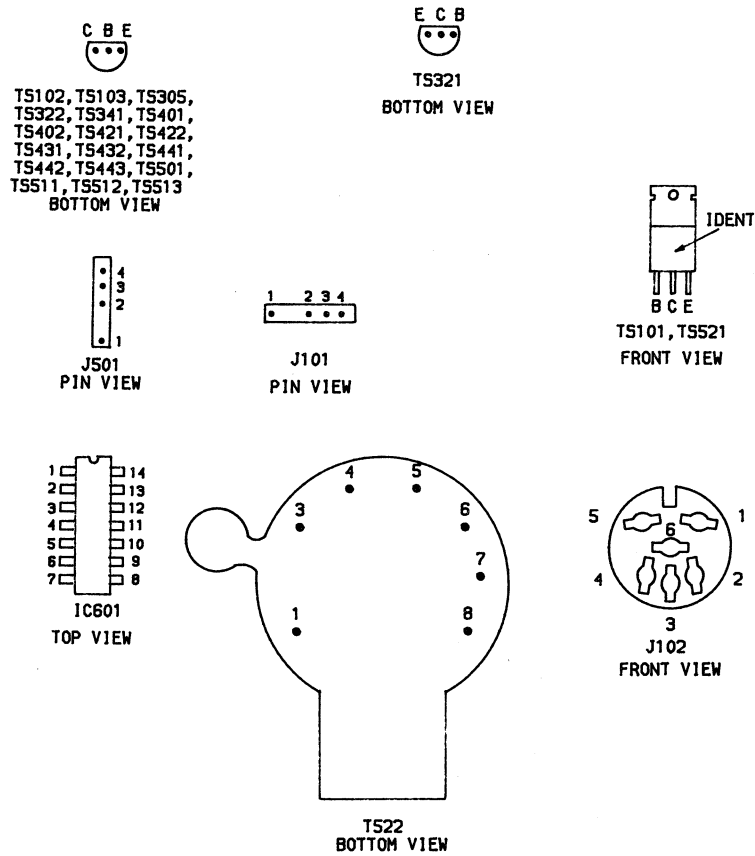
Note: If a second magnet is needed on any one pin the poles of the magnet must be aligned and both magnets rotated simultaneously.



CRT NECK ASSEMBLY



IC PINOUTS & TERMINAL GUIDES



SCHEMATIC NOTES

—× Circuitry not used in some versions

--- Circuitry used in some versions

⊕ See parts list

⊥ Ground

Voltages measured with digital meter.

Waveforms and voltages are taken from ground, unless noted otherwise.

Supply voltage maintained as shown at input.

Controls adjusted for normal operation.

Terminal identification may not be found on unit.

Capacitors are 50 volts or less, 5% unless noted.

Electrolytic capacitors are 50 volts or less, 20% unless noted.

Resistors are 1/2W or less, 5% unless noted.

Value () used in some versions.

Item numbers in rectangles appear in adjustment instruction.

Logic, waveforms and voltages taken with Monitor connected to a Computer in power up mode.

Logic Probe Display

L = Low

H = High

P = Pulse

SAFETY PRECAUTIONS

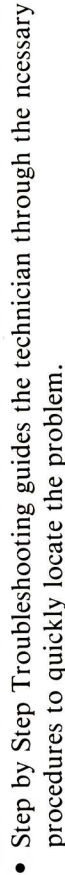
1. Use an isolation transformer for servicing.
2. Maintain AC line voltage at rated input.
3. Remove AC power from the Computer system before servicing or installing electrostatically sensitive devices. Examples of typical ES devices are integrated circuits and semiconductor "chip" components.
4. Use extreme caution when handling the printed circuit boards. Some semiconductor devices can be damaged easily by static electricity. Drain off any electrostatic charge on your body by touching a known earth ground. Wear a commercially available discharging wrist strap device. This should be removed prior to applying power to the unit under test.
5. Use a grounded-tip, low voltage soldering iron.
6. Use an isolation (times 10) probe on scope.
7. Do not remove or install boards, floppy disk drives, printers, or other peripherals with Computer system AC power On.
8. Do not use freon-propelled sprays. These can generate electrical charges sufficient to damage semiconductor devices.
9. This Computer system is equipped with a grounded three-pronged AC plug. This plug must fit into a grounded AC power outlet. Do not defeat the AC plug safety feature.
10. Periodically examine the AC power cord for damaged or cracked insulation.
11. The Computer system cabinet is equipped with vents to prevent heat build-up. Never block, cover, or obstruct these vents.
12. Instructions should be given, especially to children, that objects should not be dropped or pushed into the vents of the cabinet. This could cause shock or equipment damage.
13. Never expose the Computer system to water. If exposed to water turn the unit Off. Do not place the Computer system near possible water sources.
14. Never leave the Computer system unattended or plugged into the AC outlet for long periods of time. Remove AC plug from AC outlet during lightning storms.
15. Do not allow anything to rest on AC power cord.
16. Unplug AC power cord from outlet before cleaning Computer system.
17. Never use liquids or aerosols directly on the Computer system. Spray on cloth and then apply to the Computer system cabinet. Make sure the Computer system is disconnected from the AC power line.

Remove staples and use cover for file folder.

- Quick Component Location using the SAMS exclusive GRIDTRACE, CIRCUITTRACE, and component photographs.

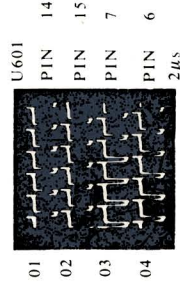
- Preliminary Service Checks section is an easy to use, step by step guide for the experienced technician or hobbyist, and even beginners.

- SAMS famous industry accepted standardized notation schematics containing CIRCUITTRACE[®], GRIDTRACE[™], waveforms, voltages and stage identification.



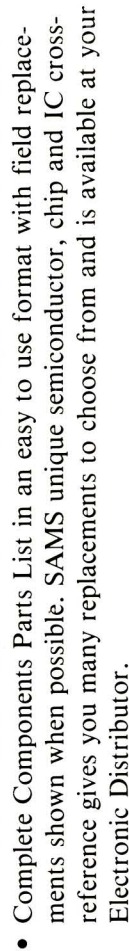
MICROPROCESSOR CHIP (CPU) OPERATION

Verify the processor is functioning by checking the signals on the address lines (pins 10 thru 24 of IC U6000) and the data lines (pins 41 thru 56) using a logic probe. If a scope is used, refer to the "Logic Chart" for the correct readings. If a scope is used, the waveforms on the address lines (except pins 22 and 23 which have no signal in Power Up mode) should be similar to Figure 1. The waveforms on the data lines should be similar to Figure 2.



- Logic Chart containing logic probe readings to isolate defective circuitry and components.

PIN NO	PIN NO	IC U100	PIN NO	IC U100	PIN NO	IC U102	IC U103	IC U104	IC U105	IC U106	IC U107	IC U108	IC U109
1		P	21	P	1	1	1	1	1	1	1	1	1
2		P	22	P	2	P	P	P	P	P	P	P	P
3		P	23	P	3	H	H	H	H	H	H	H	H



ITEM No.	TYPE No.	MFGR Part No.	REPLACEMENT DATA					NOTES
			ECG Part No.	NTE Part No.	RCA Part No.	/ENITH Part No.		
D102	1S553	1149-2576	ECG519	NTE519	SR9091/177	103-131		
D103	2N60FM	1149-2527	ECG109	NTE109	SK3088	103-29001		
D201	1N4004GP	1201-4205	ECG116	NTE116	SK3312	212-76-02		
D501 thru D503	1S553	1149-2576	ECG519	NTE519	SR9091/177	103-131		

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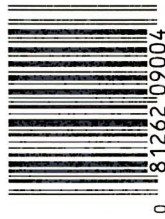


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